

Original Research Article

Pattern of neck metastasis in carcinoma of oral tongue-a prospective study of north eastern people

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ABSTRACT

Background: North eastern part of India is one of the most vulnerable regions for all sites of cancer. There is various literature regarding the pattern of cervical metastasis from different sub sites of oral cavity, however there are very few studies from the north eastern part of India, which reports one of the world highest number of cases. The aim and objectives of this study were to study the pattern of cervical lymph node metastasis in relation to prognostic factor like histological grading, laterality, depth of invasion, lymphovascular and perineural invasion and worst pattern of invasion.

Methods: A prospective study of 20 patients who had undergone surgery for carcinoma of oral tongue was conducted in State cancer institute in department of Head and neck oncology from January 2020 till June 2021. Out of 20 patients included in the study 6 (30%) were females and 14 (70%) were males.

Results: Clinically 9 patients had palpable nodes but pathologically nodes were positive in 10 patients whereas when a node was clinically not palpable in 11 patients, patients was pathologically nodes negative only in 10 patients. 2 patients had isolated II involvement. 1 patient has I(b) and level II involvement. 4 patients had level II and III together. Two patients had level II and level IV involvement. 1 patient had level I(A), I(B), III and IV involvement. None of the patient had level 5 involvements.

Conclusions: DOI, WPOI and tumor differentiation are the important prognostic parameters. We would also like to suggest surgical excision of the tumor and measurement of WPOI, DOI and assessment of histological grading to be done from frozen section for determining the type of neck dissection in T1/T2 N0 cases.

Keywords: Tongue carcinoma, Depth of invasion, Worst pattern of invasion, Cervical metastasis

INTRODUCTION

North eastern part of India is one of the most vulnerable regions for all sites of cancer. As per the ICMR report, Assam Kamrup (metro) district has the fourth highest incidence of cancer in the country (206 per 100,000 people) in men and the third highest in women (165/100,000). Because of the addictive habits and dietary habits there is an increase in number of cases in North eastern region. Tobacco consumption in the form of smoking (bidi, cigarette, hookah) and smokeless

tobacco (gutka, panmasala, khaini) stands out as a common lifestyle trait in this part of the region. As per the cancer registry report the number of cases of both men and women in selected part of Assam are: Kamrup metro district (49.7% and 24.1%), Dibrugarh district (51.6% and 22.8%), Cachar district (46.2% and 20.6%), Barooah cancer institute (56% and 25.5%).¹

Oral tongue is that sub site of the oral cavity which is posteriorly limited by circumvallate papillae. Cancer arising in this part of the tongue has distinct clinical

entity and must be differentiated from the cancer arising from base of the tongue. Lateral border of the tongue accounts for 85% of cases. Dorsum, tip and ventral surface accounts for 5% of the cases.² The lymphatic drainage of oral tongue differs from the posterior 1/3rd. Due to high lymphatic drainage, oral tongue carcinoma has high propensity for subclinical nodal metastasis and becomes a paramount prognostic criterion in patient with carcinoma of tongue.

There are various literature regarding the pattern of cervical metastasis from different sub sites of oral cavity, however there are very few study from the north eastern part of India, which reports one of the world highest number of cases.³⁻⁵ There are also various studies based on prognostic factors and its influence on cervical metastasis.⁶⁻¹⁹ Spiro et al in 1986 showed the importance of tumor thickness to select oral cancer patients who are most likely to benefit from elective treatment of the n0 neck.²⁰ Likewise Woolgar et al showed the important of prognostic factor like vascular and peri-neural invasion.⁴ A clinic-pathological correlation based on the prognostic factors can help in treatment planning and prognosis of the disease.

Aim and objectives

The aim of the study were to study the pattern of cervical lymph node metastasis in relation to prognostic factor like histological grading, laterality, depth of invasion, lymphovascular, perineural invasion and worst pattern of invasion. The objectives of this study were to analyze the clinicopathological correlation between clinically palpable and pathologically positive node and to determine that prognostic factor has an influence on nodal metastasis.

METHODS

Type of study

The study was prospective original research study.

Statistical analysis

Statistical analysis was done using proportion test, software SPSS v21.

Methodology

A prospective study in 20 patients of carcinoma of oral tongue was conducted in state cancer institute, Guwahati, Assam in department of head and neck oncology from January 2020 till June 2021, to study the pattern of nodal involvement in relation to prognostic factor like histological grading, laterality, depth of invasion, lymphovascular perineural invasion and worst pattern of invasion. The study was approved by institutional ethical committee, state cancer institute, Guwahati-32.

Inclusion criteria

Squamous cell carcinoma of anterior 2/3rd (oral tongue) which was managed by upfront surgery was, considered in study.

Exclusion criteria

Disease involving the base of tongue, post-radiotherapy or post chemotherapy patient was not taken up for study.

MRI of tongue was done in few cases (14 out of 20) but was not a mandatory-criteria for inclusion or exclusion of the cases. Rest of the cases had CECT. Surgeries performed for the tumour were wide excision, hemiglossectomy with modified radial neck dissection or selective neck dissection (extended supra-homohyoid neck dissection) depending on the clinical stage of the disease, location and extend. The specimen was sent to the same institutional pathology lab for histopathological examination. Post of follow up was done after 1 week and then after 1 month to access the surgical site. Stage III and stage IV received adjuvant treatment (concurrent chemo-radiotherapy or radiotherapy) depending on the patient general status, and post of HPE report.

Tumor staging was done according to the AJCC 8th edition classification. The various cases were studied on the basis of age, gender, cT and cN stage of the tumour, pT and pN and relation between the two, broders grading, lymphatic and perineural invasion to nodal metastasis, levels of positive nodes to depth of invasion and worst pattern of invasion and lastly to ENE.

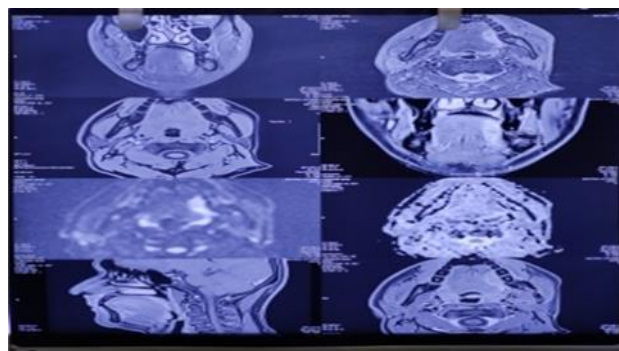


Figure 1: Pre-op MRI of tongue.



Figure 2: Cancer of left lateral border of oral tongue.

RESULTS

The 20 patients had undergone surgery for hemiglossectomy at our institute from January 2020 till June 2021. Six (30%) were females and 14 (70%) were males. Out of 20 patients 13 (65%) had right sided tumor and 7 (35%) had left sided tumors.

Maximum number of cases 7 (35%) were in the age group of 51-60 and minimum number of cases (one) was in the age group of 71-80 (Table 1). One out of 20 was T1 lesion, 14 were T2, T3 and T4 were 3 and 2 respectively.

Table 1: Age and sex.

Age (years)	Male	Female	Total
31-40	4	0	4
41-50	4	1	5
51-60	5	2	7
61-70	0	3	3
71-80	1	0	1
Total	14	6	20

There were 9 patients were clinically palpable neck and 11 cases had no clinical palpable cervical node. All the patients underwent extended supraomohyoid neck disease. Seven cases had level-II clinical lymph nodes and three cases had level-II and level-III involvement, these patients undergone the modified radical neck dissection.

Table 2: Number of patients with clinical nodal status.

Nodal status	N
N0	11
N1	6
N2a	0
N2b	3
N2c	0
N3	0

Table 3: Clinical staging of the patients.

Stage (clinical)	N
Stage I (T1N0)	-
Stage II (T2N0)	8
Stage III (T3N0, T1N1, T2N1, T3N1)	8
Stage-IVa (T2N2a, T2N2b, T3N2b, T4aN0, T4aN2b)	4

Pathological nodal status grossly the clinical and the pathological nodal status were correlating in N2b disease. 6 patients had ENE positive.

One of pT1, three of pT2, five of pT3 had no neck nodes. Three of pT2, five of pT3 and two of pT4 had nodal metastasis. One of pT2, three of pT3 and two of pT4 showed extra-nodal spread.

Table 4: Number of patients with pathological nodal status.

Nodal status	N
N0	10
N1	1
N2a	0
N2b	3
N3a	0
N3b	6

Clinicopathological correlation

Clinically 9 patients had palpable nodes but pathologically nodes were positive in 10 patients whereas when a node was clinically not palpable in 11 patients, patients pathologically nodes negative only in 10 patients.

Table 5: Clinicopathological relation between clinically palpable and pathologically positive node.

Variables	pN0	pN+
CN0	9	1
cN+	0	10

Two patients had isolated II involvement. One patient has I(b) and level II involvement. 4 patients had level II and III together. Two patients had level II and level IV involvement. One patient had level I(A), I(B), III and IV involvements.

None of the patient had level V involvements. Level II is the most common site of involvement in carcinoma of oral tongue followed by level III and level I.

Relationship of various prognostic factors to nodal metastasis is shown in Table 7. Both case of T4 had nodal involvement with ENE positivity. T2 disease had a nodal positivity rate-60%. All cases either well differentiated or moderately differentiated squamous cell carcinoma.

Moderately differentiated squamous cell carcinoma had a nodal positivity rate of 80% and WDSCC had a positivity rate of 20%. When the depth of invasion was more than 11mm nodal positivity rate was 75%, which was statistically significant. None of the cases had lymphovascular invasion however perineural invasion was present in 7 cases with a nodal positivity rate of 71.4%. Right side of the tongue was more commonly involved 13 cases and left side had 7 cases; however nodal metastasis was seen more on left side (71.4%) compared to right side.

Table 6: Correlation of nodal metastasis to DOI.

Depth of tumor (mm)	N	Nodal metastasis (%)	
		Present (N+)	Absent (N0)
≤5	3	1 (33)	2 (66)
>5	17	10 (58)	7 (41)

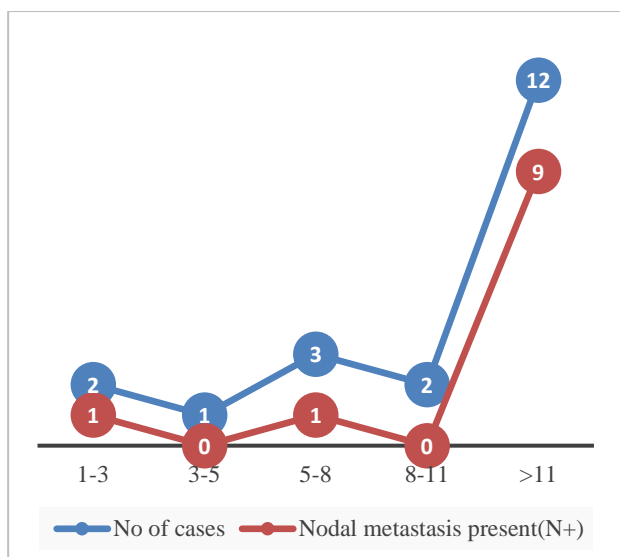


Figure 3: Line diagram showing correlation between depth of tumor and nodal status.

If depth of invasion was divided as less than or equal to 5mm, then nodal positivity rate was 33% whereas for more than 5 mm DOI, the nodal positivity rate was 58%.

Table 7: Relationship of the prognostic factors to nodal metastasis.

Variables	N	Nodal metastasis (%)		P value
		Present (N+)	Absent (N0)	
T stage				
T1	2	0 (0)	2 (100)	<0.001
T2	5	3 (60)	2 (40)	0.5485
T3	11	5 (45.5)	6 (54.5)	0.6800
T4	2	2 (100)	0 (0)	0.6800
Broders grade				
Well	15	3 (20)	12 (80)	0.0012
Moderate	5	4 (80)	1 (20)	0.0719
Poor	-	-	-	-
Depth of invasion				
1 or ≤3	2	1 (50)	1 (50)	1.00
>3 or ≤5	1	0 (0)	1 (100)	0.3171
>5 or ≤8	3	1 (33.3)	2 (66.7)	0.4552
>8 or ≤11	2	0	2 (100)	0.0833
>11	12	9 (75)	3 (25)	0.0165
Lymphovascular invasion				
Present	0	-	-	-
Absent	20	10 (50)	10 (50)	1.00
Perineural invasion				
Present	7	5 (71.4)	2 (28.6)	0.1228
Absent	13	5 (38.5)	8 (61.5)	0.2501
Laterality				
Right	13	5 (38.5)	8 (61.5)	0.2501
left	7	5 (71.4)	2 (28.6)	0.1228
ENE				
Present	6	6 (100)	-	0.0009
Absent	14	4 (28.6)	10 (71.4)	0.0262

Table 8: Correlation of WPOI with nodal status.

Worse pattern of invasion	N	Nodal metastasis (%)		P value
		Present (N+)	Absent (N0)	
Type-I	4	0	4 (20)	0.0082
Type-II	3	2 (10)	1	0.4471
Type-III	2	1 (5)	1	1
Type-IV	7	6 (30)	1	0.0094
Type-V	4	1 (5)	3	0.1859

Worse pattern of invasion, type IV was most commonly seen among all, having 7 cases with a nodal positivity rate of 30% which was statistically significant.

None of the cases with WPOI type I had nodal positivity. This was also statistically significant. None of our cases had post-operative complication and loco regional recurrence during the study period.

DISCUSSION

The tongue has characteristic structural features including a high content of muscle bundles and a rich lymphatic network that may influence the properties of tumor spread in it.¹³

Current literature includes a number of studies stating that histomorphological parameters can be used for prognostication of nodal metastasis. We therefore chose those previously studied parameters which are easy to evaluate, and suggested that this parameter has an important prognostic relevance in oral tongue cancer.

Since 1986, several studies have focused on tumor thickness.^{6-12,20} It was concluded that thickness (or depth of invasion) is of major importance for predicting cervical metastasis. The incorporation of depth of invasion into TNM staging by the AJCC 8th edition has resulted in a paradigm shift in pathological staging of oral squamous cell carcinoma.²⁷

Fukano et al did not find any cervical metastasis in any tumor in which depth of invasion was less than 3 mm, in contrary we found 1 case (33%) among 20 cases.⁶ Fukano et al in his study in 1996 found 64.7% nodal positivity rate when the depth of invasion was more than 5 mm whereas we found nodal positivity rate 58%. However, it was statistically insignificant in our study. When depth of invasion was more than 11 mm in 75% of the cases we obtained a significant p value. It is well understood that with increase of DOI the nodal positivity rate increases.

Rasgon et al and Mendelson et al described a relationship between cervical metastasis and differentiation grade.^{28,29} Majority of our cases are well differentiated (75%) with nodal positivity rate of only 20% which was statistically significant. Woolgar et al stated that both vascular and perineural invasion were important predictors of

metastasis but in our study, we did not find any statistical significance for both lymphovascular and perineural invasion.⁴

None of our case had lymphovascular invasion however nodal positivity was seen with perineural invasion (statistically insignificant) in 71.4% cases. In our study clinical tumor size was not useful in predicting nodal metastasis.

We found T2 cases with nodal positivity rate of 60% and T3 with nodal positivity rate of 45.5%. So, it will be difficult to say that with increase in tumor size the nodal positivity rate increases. This finding is similar to Woolgar et al, Rasgon et al and Byers et al even noted T stage did not correlate with cervical lymph node metastasis.^{4,28,30} Tumor surface dimension has the advantage over tumor thickness or DOI that it can be assessed clinically. Hence it is still used in initial clinical staging procedure.³¹

Several studies have previously confirmed the relationship of unfavourable WPOI with poor prognosis in oral SCC. In this study we analyze its association with nodal metastasis and found significant value with stage IV WPOI i.e.; invasive islands (<15 cells/islands), including single cell invasion. We found 30% nodal positivity rate with stage IV WPOI.

Limitations

There is one limitation of the study however, the number of patients was less.

Higher number of patients would give us a more details picture of the prognostic factors and its relation to cervical lymph nodes metastasis.

CONCLUSION

One of the arguments with the use of conventional histological morphological parameters is that they can only be evaluated after the patient has undergone surgical treatment. Therefore, the treatment which has already been planned may have to be modified based on the post-operative histology report. However out of all the parameters DOI, WPOI and tumor differentiation are the important prognostic parameters. Various authors have suggested the use of preoperative ultrasonography of the tongue for measurement of the tumor depth. So that it can be advocated in routine clinical workup. We would like to suggest doing a careful inspection and palpation of the disease in the clinical setting to assess the tumor thickness. We would also like to suggest surgical excision of the tumor and measurement of WPOI, DOI and assessment of histological grading to be done from frozen section for determining the type of neck dissection in T1/T2 N0 cases.

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