# **Original Research Article**

DOI: http://dx.doi.org/10.18203/2349-2902.isj20182081

# Relation between the depth of tumor and neck node metastasis in early carcinoma of tongue

# Pankaj Kshirsagar, Kshitij Arun Manerikar\*

Department of Surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pune, Maharashtra, India

Received: 09 May 2018 Accepted: 14 May 2018

# \*Correspondence:

Dr. Kshitij Arun Manerikar,

E-mail: drkshitijmanerikar@gmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## **ABSTRACT**

**Background:** Tongue squamous cell carcinoma (TSCC) is one of the aggressive forms of oral cancer with a high recurrence rate. Forty percentages of all TSCC patients have neck metastasis at the time of diagnosis. The status of cervical lymph nodes at presentation is the single most important prognostic factor in TSCC. This study was focused on establishing relation between the tumor depth and neck node metastasis in carcinoma of tongue. Authors accessed the patterns of cervical node metastasis in it.

**Methods:** prospective non-randomised study of 100 patients was carried out. After detail clinical history punch biopsy were taken from the tongue lesion. Biopsy proven cases of early squamous cell carcinoma (T1/T2) with clinically negative neck (cN0) were included in this study. Ultra-sonography of the tongue using 7.5 MHz probe was performed in all cases to know the depth of lesion. Final histopathological findings i.e. pT, pN, differentiation and depth of invasion were compared with pre-operative clinical and radiological findings.

**Results:** Out of 100 patients, 62 were males and 38 were females. Clinically 56 patients were belonged to T2. Ultrasonography of tumor had high sensitivity and specificity. Node positivity increased with the depth of primary tumor. On histopathological examination, positive node observed in total 25 patients. Number of occult neck node positivity raised with increased size of primary tumor. i.e. 15% and 31% with pT1 and pT2, respectively. Level II was the most common site for cervical node involvement followed by level III.

**Conclusions:** Ultra-sonography was a reliable tool to access the depth of tumor pre-operatively in the cases of tongue carcinoma patients with sensitivity and specificity more than 90%. Node positivity increased with the depth of primary tumor. Tumor thickness is a significant predictor of nodal metastasis and elective neck dissection should be decided accordingly.

Keywords: Adenocarcinoma, Colorectal, Carcinoma, Colonoscopy, Retrospective

## **INTRODUCTION**

Tongue squamous cell carcinoma (TSCC) is one of the commonest cancers within the oral cavity. Incidence of tongue cancer in India is second highest in the world.<sup>1</sup>

TSCC is significantly more aggressive than other forms of oral cancer, with a high propensity of local invasion

and spread, and a high recurrence rate.<sup>1,2</sup> It has been reported that 40% of all TSCC patients have neck metastasis at the time of diagnosis.<sup>3</sup> Patients with early-stage TSCC (T1/T2N0) showed occult nodal metastasis in approximately 20-40% cases.<sup>4</sup>

The survival in carcinoma of the tongue is poor compared to other sub-sites in oral cavity.<sup>5</sup> It has characteristic

structural features including a high content of muscle bundles and a rich lymphatic network that might be responsible for such characteristic tumor spread. The unpredictable clinical behaviour of SCC of the head and neck has led several investigators to search for factors that may be useful as indicators of cervical metastasis and prognosis.<sup>6</sup>

The concept that SCC of the head and neck metastasizes to regional lymph nodes in a predictable distribution has become generally accepted. Application of this concept has decreased the morbidity of treatment through selective modifications of the radical neck dissection and through more accurate application of irradiation to target the nodal basins at risk.<sup>7</sup>

The status of cervical lymph nodes at presentation is the single most important prognostic factor in TSCC and the presence of metastatic lymph nodes decrease survival rate by more than 50%.<sup>5,8</sup>

Currently the treatment dilemma that most head and neck oncology surgeons face is the treatment of the N0 neck in oral cavity SCC. Unfortunately, the methods of detecting occult disease are not reliable or accurate, but several new methods are promising.

The prediction for neck node metastasis in various available studies were made on the basis of computed tomography (CT), magnetic resonance imaging (MR), positron emission tomography (PET), lymphoscintigraphy (LS), ultrasonography (USG) and USG-guided fine-needle aspiration cytology.<sup>4,9-11</sup> The fact that not all tumors and metastases can be detected by such technique demonstrated the need for alternatives.<sup>11</sup>

Multiple factors can affect the rate of cervical metastasis and survival from oral cavity cancer including size of the primary tumor, site, T stage, grade, depth of invasion, biological tumor markers, perineural invasion and patient compliance. 9,12 The depth of the primary tumor has become an important in determining prognosis since 1986. 12

This study was focused on establishing relation between the tumor depth and neck node metastasis in carcinoma of tongue. We accessed the patterns of cervical node metastasis in it. We also studied the correlation between the depth of tumor by USG and final histo-pathological findings in carcinoma of tongue.

#### **METHODS**

A prospective non-randomised study of 100 patients was carried out by oncosurgeon in the surgical department of our hospital in between August,2016 to November,2017. Demographic details of all patients were recorded. After detail clinical history and examination, punch biopsy was taken from the tongue lesion. Biopsy proven cases of early squamous cell carcinoma (T1/T2) with clinically

negative neck (cN0) were included in this study. Advanced tongue carcinoma (T3/T4), clinically positive neck (cN+), previously operated cases, post chemotherapy/radiotherapy cases, biopsy negative for malignancy and patients with lesion involving base of tongue were excluded from the study.

Ultra-sonography of the tongue using 7.5 MHz probe was performed in all cases to know the depth of lesion by the same experienced sonographer. All patients underwent wide local excision of tongue with modified neck dissection type-II (MNDII).

Final histo-pathological findings i.e. pT, pN, differentiation and depth of invasion were compared with pre-operative clinical and radiological findings. Relevant statistical methods were used to make the results. Graphical presentation was done by using Microsoft Excel.

#### **RESULTS**

Out of 100 patients, 62 were males and 38 were females. Majority of patients belonged to 5<sup>th</sup> and 6<sup>th</sup> decade with mean age being 59.12 years (Table 1).

Table 1: Age and gender distribution of patients.

Age group (yrs)	Male (n=62)	Female (n=38)	Total (n=100)
31-40	6	4	10
41-50	10	6	16
51-60	24	17	41
61-70	13	6	19
>70	9	5	14

Clinically size of the tumor was underestimated as compared with pathological findings. Clinically 56 patients were belonged to T2 and this number raised to 65 on pathological confirmation. Only 5 patients were overestimated on clinical evaluation i.e. cT2 but histopathological examination showed pT1 (Table 2).

Table 2: Distribution of the patients according to the tumor size according clinical (cT) and pathological (pT) examination.

	pT1	pT2	Total
cT1	30	14	44
cT2	5	51	56
Total	35	65	100

Ultra-sonography of tumor pre-operatively had high sensitivity and specificity (Histo-pathological findings were taken as standard results). Present study showed that, sonography was a reliable tool to access the depth of tumor pre-operatively (Table 3). Node positivity increased with the depth of primary tumor. On histo-pathological examination, positive node observed in total 25 patients. There was no node in patients with

depth upto 2mm of primary tumopr (Table 4). Authors concluded from this, that depth of invasion is significant criteria for neck dissection.

Table 3: Distribution of comparison of depth of the tumor on ultra-sonography pre-operatively and histopathologically post-operatively.

Depth of the tumor in mm	Values	Histo- pathological results	Ultra- sonography findings
<2	Positive	20	22
<2	Negative	80	78
2-4	Positive	60	55
2-4	Negative	40	45
>4	Positive	20	23
>4	Negative	80	77

Table 4: Relation between depth of the tumor and node positivity.

Depth in mm	No. of patients	Node positive	% N +ve
2	20	0	0
2-4	60	13	21.8
>4	20	12	60

Number of occult neck node positivity raised with increased size of primary tumor i.e. 15% and 31% with pT1 and pT2, respectively (Table 5).

Table 5: Relation between size of the tumor (pT) and node positivity(pN) on histopathological examination.

	No. of patients	No. of N +ve	% of N +ve
pT1	35	5	15
pT2	65	20	31

Authors found that, level II was the most common site for cervical node involvement i.e. 48% followed by level III i.e. 28%. Level IV and V were the least common sites for metastasis in present study (Table 6).

Table 6: Level of cervical node involvement in early TSCC.

Level	Number	Percentage
Ia	2	8
Ib	2	8
II	12	48
III	7	28
IV	1	4
V	1	4

#### **DISCUSSION**

Neck metastasis is the most important prognostic factor in head and neck squamous cell carcinomas (SCC).<sup>1,2</sup>

Nobody can deny the important effect of therapeutic neck dissection in the prognosis of head and neck cancer patients. However, the role of elective neck dissection has been a matter of discussion, since its introduction as routine practice.<sup>3,4</sup>

Classically, neck dissection has been divided into:

- therapeutic, when it treats lymph node metastases found during physical examination or imaging studies;
- opportune, when the approach for exposure and resection of a malignant primary tumour is through the neck;
- elective, when lymph node compromise is not found clinically or by imaging, but the risk of microscopic metastases is higher than the risk associated with addition of a surgical procedure and its morbidity.<sup>7</sup>

In principle, the indication of neck dissection in oral cancer is a problem of risk-benefit evaluation between the probability of neck metastases, the probability of complications associated with neck dissection and the possible prognostic influence of late diagnosis of metastasis during follow-up.<sup>6</sup>

If the probability of neck metastases is high, to make a neck dissection with its intrinsic morbidity has the same effect as therapeutic dissection, decreasing the risk of regional recurrence. However, if the probability of neck metastases is low or nil, neck dissection simply acts as an overtreatment, where the morbidity of the neck procedure only offers a decrease in quality of life and functional deficits. Finally, the problem would be solved if it were possible to predict the risk of neck metastases.<sup>9,11</sup>

The need for elective neck dissection in patients with early stage oral cancer is controversial. A preoperative predictor of the risk of subclinical nodal metastasis would be useful. Studies have shown a strong correlation between histological tumor depth and the risk of nodal metastasis. Various studies on oral squamous cell carcinoma showed that an increasing tumor thickness is associated with an increased incidence of cervical lymph node metastasis and shortened survival. <sup>13</sup>

The mean age in present study was 59.12 years. Similar findings found in another studies where, mean age of patients was 52.6 years and 59.5 years respectively. All the above studies reported predominance of carcinoma tongue in males which is consistent with our findings.

Authors found that level II cervical nodes were the most common station for metastasis of carcinoma tongue. Similar studies conducted by Layland et al and Woolgar et al also showed that the level II is the most common site for metastasis in early tongue carcinoma followed by level III.<sup>3,10</sup>

Cervical lymph node status is the most important prognostic factor in patients with TSCC.<sup>5</sup> Available literature states that, chances of occult neck metastasis is almost nil if depth of tumor is up to 2mm and similar results were observed in present study.<sup>5,6,8</sup> Ganly et al, Haksever et al and Pentenero et al in their study found that, occult neck metastasis in tumors with depth >4mm were 62.2%, 64.70% and 70.3% respectively. Authors observed that, tumors with depth >4 mm had 60% neck metastasis in present study.

Authors utilised, ultrasonography to know pre-operative depth of tumor because it was quickly available and low cost effective. Ultrasonography could differentiated tumor easily from the surrounding tissue as a hypoechoic irregular formations. Moreover, Unlike CT and MRI artefacts did not matter in results. Available literature mentions utilisation of other modalities for the same. <sup>4,9,11</sup>

There is a huge controversy regarding the treatment of the neck in patients with cT1-2N0 tongue cancer. The various treatment modalities advocated include elective neck dissection (END), radiotherapy or wait and watch policy with therapeutic neck dissection in the event of neck recurrence. Ganley et al studied the depth of invasion as a predictive factor for cervical lymph node metastasis in tongue carcinoma and showed the incidence of occult neck metastasis was 30% whereas, another study showed that incidence of same was up to 40%. Cocult neck metastasis in present study was 25%. Incidence in study was low as compared with the other studies and possible explanation is patients with early tongue cancer (T1-T2, N0) were included in the study.

Taylor et al conducted a study to know if preoperative ultrasonography was accurate in measuring tumor thickness and predicting the incidence of cervical metastasis in oral cancer and found that the rate of metastasis was 33% in N0 necks. <sup>15</sup> In the group with tumors <5mm in depth, the neck metastatic rate was 0%, as compared with 65% in the group with depth >5mm. Another study found that, the average of the measured tumor depth was more in patients with positive neck nodes and depth of tumor was lesser in the group of T1 / T2 as opposed to it was in T3 / T4 tumors. <sup>8</sup> Authors observed that ultra-sonography of tumor pre-operatively had high sensitivity and specificity in present study.

#### **CONCLUSION**

Present study proved that, ultra-sonography was a reliable tool to access the depth of tumor pre-operatively in the cases of tongue carcinoma patients with sensitivity and specificity more than 90%. Authors observed that, node positivity increased with the depth of primary tumor. Authors conclude that, tumor thickness is a significant predictor of nodal metastasis and elective neck dissection should be decided accordingly. Present study also proved that, level II was the most common site for cervical node

involvement followed by level III nodes in early tongue squamous cell carcinoma.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

#### REFERENCES

- 1. Perkin D, Whelan S, Ferlay J, Raymond L, Young J. Cancer incidence in five continents. IARC Sci Pub. 1995;155:1-190.
- 2. Lydiatt D, Robbins K, Byers R, Wolf P. Treatment of stage I and II oral tongue cancer. Head Neck Surg. 1993;15:308-12.
- 3. Layland M, Sessions D, Lenox J. The influence of lymph node metastasis in the treatment of squamous cell carcinoma of the oral cavity, oropharynx, larynx, and hypopharynx: N0 versus N+. Laryngoscope. 2005;115:629-39.
- Teichgraeber J, Clairmont A. The incidence of occult metastases for cancer of the oral tongue and floor of the mouth: treatment rationale. Head Neck Surg. 1984;7:15-21.
- 5. Ganly I, Patel S, Shah J. Early stage squamous cell cancer of the oral tongue- clinic-pathologic features affecting outcome. Cancer. 2012;118:101-11.
- Haksever M, Inancli H, Tunçel U, Kürkçüoğlu S, Uyar M, Genç O et al. The effects of tumor size, degree of differentiation, and depth of invasion on the risk of neck node metastasis in squamous cell carcinoma of the oral cavity. Ear Nose Throat J. 2012;91:130-5.
- Capote A, Escorial V, Muñoz-Guerra M, Rodríguez-Campo F, Gamallo C, Naval L. Elective neck dissection in early-stage oral squamous cell carcinoma - does it influence recurrence and survival? Head Neck. 2007;29:3-11.
- 8. Pentenero M, Gandolfo S, Carrozzo M. Importance of tumor thickness and depth of invasion in nodal involvement and prognosis of oral squamous cell carcinoma: a review of the literature. Head Neck. 2005;27:1080-91.
- 9. Jalisi S. Management of the clinically negative neck in early squamous cell carcinoma of the oral cavity. Otolaryngol Clin North Am. 2005;38:37-46.
- Woolgar JA, Scott J, Vaughan ED, Brown JS, West CR, Rogers S. Survival, metastasis and recurrence of oral cancer in relation to pathological features. Ann R Coll Surg Engl. 1995;77:325-31.
- 11. Kowalski L, Sanabria A. Elective neck dissection in oral carcinoma: a critical review of the evidence. Acta Otorhinolaryngol Ital. 2007;27:113-7.
- 12. Jones K, Lodge-Rigal R, Reddick R, Tudor G, Shockley W. Prognostic factors in the recurrence of stage I and II squamous cell cancer of the oral cavity. Arch Otolaryngol Head Neck Surg. 1992;118:483-5.

- 13. Pinto F, de Matos L, Palermo F, Kulcsar M, Cavalheiro B. Tumor thickness as an independent risk factor of early recurrence in oral cavity squamous cell carcinoma. Eur Arch Otorhinolaryngol. 2014;271:1747-54.
- 14. Attar E, Dey S, Hablas A, Seifeldin I, Ramadan M, Rozek L, Soliman A. Head and neck cancer in a developing country: a population-based perspective across 8 years. Oral Oncol. 2010;46(8):591-6.
- 15. Taylor SM, Drover C, MacEachern R, Bullock M, Hart R, Psooy B et al. Is preoperative

ultrasonography accurate in measuring tumor thickness and predicting the incidence of cervical metastasis in oral cancer? Oral Oncol. 2010;46:38-41.

**Cite this article as:** Kshirsagar P, Manerikar KA. Relation between the depth of tumor and neck node metastasis in early carcinoma of tongue. Int Surg J 2018;5:2154-8.