

## Original Research Article

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# Frequency of metastasis to posterior triangle and lower deep jugular lymph nodes in patients with squamous cell carcinoma of oral cavity having clinically N<sub>1</sub> neck

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## ABSTRACT

**Background:** Oral cancer is the sixth most common cancer in the world and is largely preventable. The objective of the study is to find out the frequency of metastasis to posterior triangle lymph nodes and lower deep jugular (supraclavicular) lymph nodes in patients with squamous cell carcinoma of oral cavity having clinically N<sub>1</sub> neck.

**Methods:** A hospital based prospective study. This prospective study was conducted in R. L. Jalappa Hospital and Research Centre and SDU Medical College Kolar, Karnataka. 30 patients having oral squamous cell carcinoma with clinically N<sub>1</sub> neck (single ipsilateral lymph node less than 3cms in diameter) undergoing modified radical neck dissection in R. L. Jalappa Hospital and Research Centre.

**Results:** In our study, 4 were male (13%) and 26 were females (87%). The age of the patients ranged from 41-70 years with a mean age of 53 years. Majority of primary tumours were buccal mucosa tumours (24). We had 6 anterior 2/3<sup>rd</sup> tongue tumours. The primary tumour staging included 17 T<sub>2</sub> lesions (57%), 3 T<sub>3</sub> lesions (10%), 10 T<sub>4</sub> lesions (33%) in patients with buccal mucosa carcinoma, fourteen patients had T<sub>2</sub> disease, 9 patients had T<sub>4</sub> and one patient had T<sub>3</sub> disease.

**Conclusions:** Most common nodal involvement in buccal mucosa carcinoma was level Ib (submandibular lymph node). The incidence of level IV (supraclavicular) and level V (posterior triangle) lymph node metastasis is low in buccal mucosa carcinoma patients with clinically N<sub>1</sub> neck.

**Keywords:** Metastasis, Squamous cell carcinoma, Posterior triangle lymph nodes, Lower deep jugular

## INTRODUCTION

In India oral cancer is the commonest malignant neoplasm, accounting for 20-30% of all cancers. Southern India presents the highest oral cancer incidence rates among women worldwide and the highest in India overall.<sup>1</sup>

These very high incidence rates in Indian population reflect the continued prevalence of paan chewing in India, a habit which is equally common in both genders.<sup>2</sup>

Besides paan chewing, the effects of tobacco use and alcohol drinking are clear risk factors for oral cancer in India and elsewhere.<sup>3-5</sup> Among Indian men, the attributable oral cancer risk due to smoking, alcohol and paan chewing is over 80% and among women in India, paan chewing alone explains almost all (over 90%) the oral cancer risk.<sup>6-8</sup>

More than 90-95% of oral cancers are SCC or one of its variants.<sup>9</sup> Malignancy within oral cavity is potentially devastating due to the associated morbidity. Therefore

early detection and appropriate treatment of cancers remains the most effective weapon against cancers of the oral cavity. A critical prognostic factor in head and neck cancer is spread of disease to regional lymph node. In the early 1800s, it was believed that once head and neck cancer had spread to the cervical lymph nodes, complete removal of the disease was impossible.

In spite of nerve sparing neck dissections (MRND/SND), some degree of morbidity still persists due to de-vascularization/neuropraxia during surgical manipulation of SAN. These nerve injuries are seen mainly in posterior triangle dissection in neck/supraspinal accessory lymph node clearance.<sup>9-14</sup>

Hence this cross-sectional study was undertaken to find out the frequency of metastasis to posterior triangle lymph nodes and lower deep jugular (supraclavicular) lymph nodes in patients with squamous cell carcinoma of oral cavity having clinically N<sub>1</sub> neck.

## METHODS

This prospective study was conducted in R. L. Jalappa Hospital and Research Centre and SDU Medical College Kolar, Karnataka. Thirty patients having oral squamous cell carcinoma with clinically N<sub>1</sub> neck (single ipsilateral lymph node less than 3cms in diameter) undergoing modified radical neck dissection in R.L. Jalappa Hospital and Research Centre between December 2010 and June 2012 were enrolled in the study. Permission for the study was obtained from the college authorities prior to commencement. Written informed consent taken for inclusion in the study, surgical excision of primary tumour, modified radical neck dissection and histopathological examination.

### Inclusion criteria

Patients with histologically proven oral squamous cell carcinoma with clinically single ipsilateral lymph node less than 3 cms in greatest diameter (N<sub>1</sub>).

### Exclusion criteria

- Patients with no palpable lymph nodes (N<sub>0</sub> neck) with oral squamous cell cancers.
- Oral squamous cell cancer patients treated by other methods such as radiotherapy or chemotherapy.
- Patients with oral cancer with advanced cervical lymph node metastasis (N<sub>2</sub>, N<sub>3</sub>).
- Patients with non-squamous malignancies of oral cavity.
- Patients unfit for surgery (neck dissection).
- Patients not willing for surgical treatment.

Following surgical excision of the primary lesion along with simultaneous neck dissection (modified radical), contents of posterior triangle and lower deep jugular lymph nodes along with other dissected lymph nodes was

sent for histopathology after marking the various lymph node levels.

Pathological assessment of metastatic nodes: lymph nodes were identified by visual inspection and palpation and were dissected out from the fixed gross specimen in each of the five anatomic levels. All nodes were measured and processed routinely. Histological assessment was made on a single hilar section with examination of step serial sections in selected nodes.

Metastasis to posterior triangle and lower deep jugular lymph nodes and their size were documented. In addition documentation of other criteria in the primary tumor which affect lymph node metastasis like T-stage, histological grade and presence of other positive lymph nodes was done.

### Statistical analysis

The data was analyzed using descriptive statistics like proportions and comparison done using Chi-square tests.

## RESULTS

Of the 30 patients included in our study, 4 were male (13%) and 26 were females (87%). The age of the study group patients ranged from 41-70 years with a mean age of 53 years. In our study, the majority of primary tumours were buccal mucosa tumours (24). We had 6 anterior 2/3<sup>rd</sup> tongue tumours. The primary tumour staging included 17 T<sub>2</sub> lesions (57%), 3 T<sub>3</sub> lesions (10%), 10 T<sub>4</sub> lesions (33%). All patients in our study selected were having N<sub>1</sub> neck. In our study, in patients with buccal mucosa carcinoma, fourteen patients had T<sub>2</sub> disease, nine patients had T<sub>4</sub> and one patient had T<sub>3</sub> disease. In patients with carcinoma lateral border tongue, three patients had T<sub>2</sub> disease, two patients had T<sub>3</sub> and one patient had T<sub>4</sub> disease.

In our study, in patients with buccal mucosa carcinoma, fourteen patients had T<sub>2</sub> disease, nine patients had T<sub>4</sub> and one patient had T<sub>3</sub> disease.

**Table 1: Site of primary tumour and clinical staging.**

Clinical staging	Site of primary tumour	
	Buccal mucosa (n=24)	Tongue (n=6)
T <sub>2</sub>	14	3
T <sub>3</sub>	1	2
T <sub>4</sub>	9	1

In patients with carcinoma lateral border tongue, three patients had T<sub>2</sub> disease, two patients had T<sub>3</sub> and one patient had T<sub>4</sub> disease (Table 1).

In buccal mucosa carcinoma, out of 24 patients, 16 patients underwent wide excision with hemi-

mandibulectomy. In these 16 cases, 2 patients had reconstruction with double flap (DP+PMMC) while rest 14 cases with island pectoralis major myocutaneous (PMMC) flap. Out of remaining 8 patients, 2 patients underwent marginal mandibulectomy. In all these 8 patients, reconstruction was done using nasolabial flap in 1 patient, buccal pad of fat in 2 patients, masseter flap in 1 patient and forehead flap in 4 patients. In carcinoma anterior 2/3<sup>rd</sup> tongue, all 6 patients underwent hemiglossectomy with simultaneous modified radical neck dissection (Table 2).

**Table 2: Surgery done.**

	Treatment of the primary tumour	No. of cases
<b>Buccal mucosa carcinoma</b>	Wide excision	24
<b>Tongue carcinoma</b>	Hemi glossectomy	6
<b>Neck dissection</b>	MRND (Functional neck dissection)	28
	MRND (Sternomastoid sacrificed)	2
<b>Reconstruction in buccal mucosa carcinoma</b>	Nasolabial flap	1
	PMMC+DP	2
	Buccal pad of fat	2
	Masseter flap	1
	Forehead flap	4
	Island PMMC	14
<b>Hemimandibulectomy</b>		16
<b>Marginal mandibulectomy</b>		2

Histopathologic examination of the tumour specimens in our study revealed squamous cell carcinoma in 26 patients and verrucous variant of squamous cell carcinoma in 4 patients. Majority of our patients belonged to well differentiated squamous cell carcinoma (19 out of 30).

Total number of lymph nodes examined included 327. Out of 30 N<sub>1</sub> necks, only 13 necks had lymph node metastasis, rest were found to be false positive (reactive) nodes.

**Table 4: Pathological stage and nodal metastasis.**

Pathological staging	Site of primary tumour									
	Buccal mucosa (*n=10/24)					Tongue (*n=3/6)				
	I	II	III	IV	V	I	II	III	IV	V
<b>T<sub>2</sub></b>	2	2	-	-	-	2	5	-	-	-
<b>T<sub>3</sub></b>	1	1	-	-	-	-	2	-	1	-
<b>T<sub>4</sub></b>	5	3	1	-	-	0	-	-	-	-

\*n=number of patients showing lymph node metastasis out of the total number of patients for each primary site.

Among 13 pathologically proven metastatic cases, 10 patients with buccal mucosa carcinoma had lymph nodes showing squamous cell deposits at level I and II. None of the patients had metastasis to level IV or level V in buccal mucosa carcinoma.

Out of 3 pathologically proven metastasis, in tongue carcinoma, 1 patient had metastasis to level IV. Metastases to level V did not occur in any patient (Table 3).

**Table 3: Pattern of metastasis to neck nodes.**

Neck level	Site of primary showing metastasis to neck nodes	
	Buccal mucosa *n=10/24	Tongue *n=3/6
<b>Ia</b>	2	1
<b>Ib</b>	9	3
<b>IIa</b>	2	3
<b>IIb</b>	1	2
<b>III</b>	1	0
<b>IV</b>	0	1
<b>V</b>	0	0
<b>Total metastatic nodes</b>	15	10

\*n=number of patients showing lymph node metastasis out of the total number of patients for each primary site.

In our study, we found high false positive rates (clinically positive nodes, pathologically negative for tumour). The probable cause may be inflammatory lymphadenopathy owing to poor orodental hygiene. False negative were nil in this study as N<sub>0</sub> cases were excluded from the study.

In buccal mucosa carcinoma, level I was positive in 2 T<sub>2</sub> lesions, 1 T<sub>3</sub> and 5 T<sub>4</sub> lesions while level II was positive in 2 T<sub>2</sub>, 1 T<sub>3</sub>, 3 T<sub>4</sub> cases and level III in 1 T<sub>4</sub> case. This shows level I being commonly involved in the study. None of the patients had metastasis to nodal levels IV and V in any "T" stage in our study.

In tongue carcinoma, level II and level IV was involved in 1 T<sub>3</sub> stage. Level I and II was involved in 2 T<sub>2</sub> stage patients. No metastasis at level V was seen in any patient (Table 4).

**Table 5: False positive rates.**

Clinical examination	%
False positive	57
False positives in few other studies <sup>17, 18</sup>	40

## DISCUSSION

Our study involved 30 patients in the age group ranging from 41-70 years with mean age 53 years. Out of 30 patients, four were males (13%) and the majority (i.e., twenty six) were females (87%). This shows that oral cancers are more common among females in this region. This can be attributed to the habit of chewing tobacco, beetle nuts and keeping a cud in the mouth.

In literature, southern India presents the highest oral cancer incidence rates among women worldwide and the highest in India overall.<sup>1,6-8</sup> These very high incidence rates in Indian population reflect the continued prevalence of pan chewing in India, a habit which is equally common in both genders.<sup>2,6-8</sup>

Majority of the patients in our study had malignancy involving buccal mucosa and tongue (80% and 20% respectively). Owing to their addiction to chewing beetle nuts and tobacco and keeping a cud, buccal mucosa cancer is by far the most common malignancy in this region.

In our study, seventeen patients (57%) had early malignancy (T<sub>2</sub>) and 43% had advanced malignancy T<sub>3</sub> (10%) and T<sub>4</sub> (33%). Out of 30 patients, thirteen patients had metastases on histopathological examination and the rest seventeen cases had reactive lymph nodes on histopathology. This high incidence of false positive cases of lymphadenopathy on clinical examination could be attributed to reactive lymphadenopathy due to poor oral hygiene. There were no false negatives as patients with N<sub>0</sub> neck were excluded from the study (Table 5).

In other studies, the incidence of false-negative neck nodes was lower in well differentiated primary lesions when compared to false positive nodes. Micro metastases or metastasis to nodes measuring less than 1.7 cm accounted for misdiagnosed cases.<sup>15, 16</sup>

In buccal mucosa carcinoma, out of 24 patients, 16 patients underwent wide excision with hemi-mandibulectomy. In these 16 patients, 2 patients had reconstruction with double flap (DP+PMMC) while rest 14 cases with island pectoralis major myocutaneous (PMMC) flap. Out of remaining 8 patients, 2 patients underwent marginal mandibulectomy. In all these 8 patients, reconstruction was done using nasolabial flap in 1 patient, buccal pad of fat in 2 patients, masseter flap in 1 patient and forehead flap in 4 patients.

In carcinoma anterior 2/3<sup>rd</sup> tongue, all 6 patients underwent hemiglossectomy with simultaneous modified radical neck dissection.

Hemimandibulectomy was done whenever tumour was involving posterior most region of buccal mucosa or involving the bone. Marginal mandibulectomy was done when tumour was reaching lower alveolus without infiltrating bone. Hemiglossectomy was done in 6 patients of tongue cancer as they were well lateralised not extending to midline or base tongue.

In our study, among buccal mucosa tumours with N<sub>1</sub> neck, 10 out of 24 (41.6%) patients had metastasis. Among those with pathologically involved nodes (p N<sub>1</sub>), level I cervical node was most commonly involved site followed by level II and III. Level IV or V was not involved in any patient. This is in accord with other studies in literature.<sup>17,18</sup>

In literature, metastasis to level V is not expected if the other nodal levels are not involved. Even if the other levels are involved, risk of occult metastasis to level V is not above 20%.<sup>17,18</sup> According to a large study by Davidson, the metastasis at level V is least expected and metastasis to level V occurs only when other levels are involved.<sup>19</sup> Shah in his study found level IV metastasis in 3-6% of oral cancers.<sup>20</sup> Similar observations were found in few other studies.<sup>17, 18</sup>

In our study, among tongue tumours with N<sub>1</sub> neck, three out of six (50%) patients had metastases. Among these 3 patients, there was metastasis at level IIA (2 patients) and level IV (one patient). There was no case with isolated involvement of level IV in the absence of nodal disease at level I or II. Metastases to level V did not occur in any patient. In literature, metastasis to level IV in oral tongue cancers is reported to be higher (15-17%).<sup>20,21</sup>

## CONCLUSION

There is high prevalence of buccal mucosa cancers in Kolar district. There is female preponderance in oral malignancy in our study. In oral malignancy there is a high incidence of false positive lymph nodes. Most common nodal involvement in buccal mucosa carcinoma was level Ib (submandibular lymph node). The incidence of level IV (supraclavicular) and level V (posterior triangle) lymph node metastasis is low in buccal mucosa carcinoma patients with clinically N<sub>1</sub> neck.

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