

Original Research Article

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Pathoradiological association between depth of invasion and neck node metastasis in oral cavity tumours

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ABSTRACT

Background: The aims of the study were to know whether the increase in the depth of invasion in oral cavity carcinoma assessed histopathologically and radiologically co-relates with neck node metastasis and to accurately co-relate the radiological thickness at which neck dissection is required.

Methods: A retrospective study has been conducted over thirty patients with oral cavity carcinoma (buccal mucosa and tongue) in the time period of April 2018 to December 2018 who were operated in our tertiary care hospital.

Results: Depth of invasion is relatable histopathologically and radiologically, is directly proportional to neck node metastasis. Pre-operative radiology is a reliable modality to rule out the need of neck node dissection.

Conclusions: Depth of invasion is directly proportional to the incidence of neck node metastasis and pre-operative radiology has been reliable to rule out the need of neck dissection and reduce its morbidity.

Keywords: Tongue carcinoma, Buccal mucosa carcinoma, T1-T2 lesions with N0 neck

INTRODUCTION

Head and neck cancers are the most common cancers in the developing countries especially in Southeast Asia.^{1,2} Oral cancer is the most common cancer in India, as four out of ten of all cancers are oral cavity cancers.^{3,4} Cervical lymph node metastasis has remained the most important prognostic factor.^{1,2,4-8} However, many previous studies have studied different predictive factors for cervical nodal metastasis in oral carcinoma among which depth of tumour invasion (DOI) is the most important.^{2,4-6,8-12} Hence, we conducted the study to know whether the increase in the depth of invasion in oral cavity carcinoma assessed histopathologically and radiologically co-relates with neck node metastasis and to accurately co-relate radiological thickness at which neck dissection is required.

METHODS

A retrospective study was conducted in thirty patients in the age group of twenty five to seventy five years of both genders who came with ulcer or growth over tongue or buccal mucosa to the outpatient department in the department of otorhinolaryngology, for a period of nine months from April 2018 to December 2018.

A biopsy was conducted and if carcinoma was detected in the histopathological examination of the sample, patient was subjected to computed tomography of oral cavity and neck. Only, clinically T1 and T2 lesions with N0 neck were considered in this study. Wide local excision with neck node dissection was planned and sample sent for histopathological examination. Depth of invasion was co-related with the neck node metastasis. According to our study, thickness is the third dimension of tumour (surface

of the tumour to the deepest part). Depth of invasion (DOI) is the distance between the adjacent mucosal basement membrane and deepest part of the tumour.

Inclusion criteria

Inclusion criteria were patients with biopsy proven oral tongue and buccal mucosa carcinoma with clinically N0 neck (T1 and T2 stages); patients willing for undergoing investigations and surgery.

Exclusion criteria

Exclusion criteria were patients with ulcer over tongue and buccal mucosa but biopsy negative; patients with non-squamous cell carcinoma of tongue and buccal mucosa; patients with traumatic ulcer over tongue; patients with T3 or T4 lesion or clinically N+ neck; patients with advanced stage making it inoperable.

The histopathological specimens were reviewed by a team of expert pathologists for depth of invasion and neck node metastasis.

The exposure settings in computed tomography scans were 130 kVp and 35 mA. The sections were taken with slice thickness of 5 mm; if required, 1 mm slice thickness was also considered. The sections were reviewed by expert radiologists for calculating depth of invasion radiologically.

RESULTS

Tongue was more commonly (N=18) involved than buccal mucosa (N=12) by carcinoma.

Table 1: Site of involvement in carcinoma tongue.

Site of involvement	Percentage (%)	Number of cases
Right lateral border	20	06
Left lateral border	33.33	10
Dorsum	6.66	02
Total		18

Left lateral border is more commonly involved as compared to right lateral border and dorsum.

Table 2: Site of involvement in carcinoma buccal mucosa.

Site of involvement	Percentage (%)	Number of cases
Right buccal mucosa	13.34	4
Left buccal mucosa	26.67	8
Total		12

Left buccal mucosa is more commonly involved as compared to right buccal mucosa.

Exophytic growths (80%) were more common in the study population than the infiltrative ulcers (20%).

Table 3: Types of ulcers in oral cavity carcinoma.

Types of ulcers	Tongue	Buccal mucosa	Total
Exophytic	13	9	22
Infiltrative	5	3	8
Total	18	12	30

Considering the Broder's grading, moderately differentiated (53.33%) ulcers were more common as compared to well differentiated (26.66%) and poorly differentiated (20%) ones.

Table 4: Broder's grading of ulcers in oral cavity carcinoma.

Broder's grading	Tongue	Buccal mucosa	Total
Well differentiated	5	3	8
Moderately differentiated	9	7	16
Poorly differentiated	4	2	6
Total	18	12	30

Dividing the study population in to two sets with age group of 25-50 year olds (26.67%) and 51-75 year olds (73.34%), the older age group is more affected.

Table 5: Age distribution in oral cavity carcinoma.

Age in years	Tongue	Buccal mucosa	Total
25-50	5	3	8
51-75	13	9	22
Total	18	12	30

Table 6: Sex incidence in oral cavity carcinoma.

Sex	Tongue	Buccal mucosa	Total
Males	12	08	20
Females	06	04	10
Total	18	12	30

Males are more commonly affected than females irrespective of the age group (as per our observation, may be because males come early for diagnosis with the onset of the symptoms while females neglect the symptoms and delay consultation).

Out of the thirty patients considered, twenty-nine had a history of tobacco intake in the form of either 'mawa' or 'gutka' for a period of five years and more.

Out of thirty patients with T1 and T2 lesion with clinically N0 neck, two patients had ulcer only in two

dimensions, i.e. no depth of invasion was seen; while six patients had DOI of 4 mm, twelve patients had DOI of 5 mm, four patients had DOI of 6 mm, other four patients had DOI of 8 mm and the remaining two patients had DOI of 9 mm.

Table 7: Number of cases with respect to DOI.

DOI in mm	Number of cases (%)
0	02 (6.67)
4	06 (20)
5	12 (40)
6	04 (13.34)
8	04 (13.34)
9	02 (6.67)
Total	30

Table 8: Co-relation between DOI and neck node metastasis.

DOI (mm)	Nodal metastasis	
	pN0 (%)	pN+ (%)
0	02 (6.67)	00
4	06 (20)	00
5	12(40)	00
6	04 (13.34)	00
8	02 (6.67)	02 (6.67)
9	00	02 (6.67)
Total	26	04 30

Among thirty cases, four cases were pN+. Out of four cases, two (6.67%) were having depth of 8 mm and two (6.67%) cases had depth of 9 mm.

Table 9: Co-relation between radiological depth and nodal metastasis.

		Radiological depth		
		<2.5 cm	>2.5 cm	Total
Pathological nodes	pN0	25	1	26
	pN+	0	4	4
	Total	25	5	30

Results of our study showed that four pathologically positive node (pN+) cases were having radiological depth >2.5 cm. And out of twenty-six pathological node negative cases, only one had radiological depth >2.5 cm.

DISCUSSION

Hence, we found an association between depth of invasion (DOI) and neck node metastasis in cases of carcinoma tongue and carcinoma buccal mucosa.^{2,4-6,8,10-12} Eight mm in oral cavity carcinoma seems to be the cut off depth of invasion above which incidence of nodal metastasis increases.¹⁰ Cervical metastatic rates (pN+) are significant at depth more than eight mm in oral tongue and buccal mucosa carcinoma in our study. Hence, neck

in these patients should be addressed along with primary tumour excision. Considering the small study population, statistical significant data cannot be obtained. Considering the radiological depth, more than 2.5 cm directly co-relates with pathologically positive neck nodes.

According to O-charoenrat et al, Fukano et al and Rasgon et al, the tumour thickness exceeding 5 mm is an indication for elective neck treatment which as per our study is 8 mm and according to Tabatabai et al, elective neck dissection is required at 1.5 mm depth of invasion in N0 lesions.¹³⁻¹⁶

CONCLUSION

Tongue is more commonly involved than the buccal mucosa. T1 and T2 lesions mostly comprise of exophytic moderately differentiated carcinoma. Depth of invasion is an important prognostic indicator in tongue and buccal mucosa carcinoma. As depth of tumour invasion increases, chances of cervical lymph node metastasis increases significantly. For oral tongue and buccal mucosa, 8 mm of depth of tumour invasion was calculated as the cut-off depth, above which incidence of nodal metastasis increases to 13.34% in T1 and T2 lesions. Neck in these patients must be addressed along with primary tumour excision. Radiological investigations (MRI, CT scan) play an important role in nodal metastasis detection and are considered in carcinoma of oral tongue and buccal mucosa especially in clinically N0 neck. Radiological depth more than 2.5 cm is more co-related with the pathologically positive neck nodes. Development of future technologies for more accurate assessment of DOI will further assess to solve the controversies of management. Intra-oral ultrasonography is being developed as an important pre-operative tool for the assessment of the depth of invasion.

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