Research Article

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Assessment of Correlation of Tumour Site and Size with Lymph Node Metastasis: A Clinical Study

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ABSTRACT

Background: Oral squamous cell carcinoma is an invasive lesion with the presence of perineural growth. The present study was conducted to correlate the size of tumor with tumor metastasis in study groups.

Materials & Methods: The present study was conducted on 84 patients of both genders. All patients were clinically and histopathologically diagnosed cases of OSCC. All cases were evaluated for the tumour size and lymph node status with the help of MRI. In all patients careful lymph node examination was performed. MRI was performed on 1.5 Tesla Magnetom Avanto systems. Contrast-enhanced images were obtained after intravenous injection of 0.1 mmol/kg body weight of gadobenate dimeglumine. Postcontrast images were obtained in at least two planes. In MRI scan, tumor size and number of lymph node metastasis were studied.

Results: Age group 20-40 years had 14 males and 7 females, 40-60 years had 32 males and 15 females and >60 years had 10 males and 5 females. 42 cases were of alveolus, 30 were of buccal mucosa and 12 of tongue. Lymph node metastasis was evident in 62 cases (73.8%), 40 cases were >3 cm (78.4%), 12 between 2-3 cm (66.7%) and 10 were <2 cm (66.7%). Out of 44 cases of alveolus cancer, 32 (72.7%) showed positive results, 21 (70%) out of 30 buccal mucosa cancer showed positive results and 9 (90%) out of 10 tongue cancer showed positive metastasis. There was positive Pearson's correlation of lymph node metastasis with size and site of tumor ($P< 0.05$).

Conclusion: Tumor size measured on MRI can be used as a predictive indicator for cervical lymph node metastasis. A strong positive correlation of tumor size and site with tumor metastasis was observed.

Keywords: Lymph node, Oral squamous cell carcinoma.

INTRODUCTION

Oral cancer is the sixth most common cause of cancer-related deaths worldwide. Oral cancer is the second most common cancer.[1] Oral squamous cell carcinoma is an invasive lesion with the presence of perineural growth. It has a significant recurrence rate and frequently metastasizes to cervical lymph nodes.[2] Lymph node metastatic tumors occur in about 40% of patients with oral cancer. Clinically, their manifestations are hidden in rates of 15% to 34%.[3]

The presence of metastatic cervical lymphadenopathy is of particular importance as with every single nodal metastasis, survival of the patient is reduced by one half.[4] Thus, regional metastasis is one of the most important factors in the prognosis and treatment planning of patients with head and neck squamous cell carcinomas. The inaccuracies in clinical examination have been well

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documented and the diagnostic imaging modalities have been shown to have superior diagnostic accuracy in detecting occult nodal metastasis.[5] Most commonly used tumour, node and metastasis (TNM) classification system fails to define the exact size and measurements of the tumor including diameter, length, width, area, volume and tumor thickness and the clinical issues related to it. The appropriate management of the oral carcinomas requires a good understanding of the factors affecting incidence, patterns and prognostic implications of the nodal metastasis.[6] The present study was conducted to correlate the size of tumor with tumor metastasis in study groups.

MATERIALS & METHODS

The present study was conducted in the department of Oral pathology & Microbiology. It comprised of 84 patients of both genders. The study protocol was approved from institutional ethical committee. All patients were informed regarding the study and written consent was obtained. All patients were clinically and histopathologically diagnosed cases of OSCC. All cases were evaluated for the tumour size and lymph node status with the help of MRI.

General information such as name, age, gender etc. was recorded. In all patients careful lymph node examination was performed. MRI was performed on 1.5 Tesla Magnetom Avanto systems (Siemens, Germany). Contrast-enhanced images were obtained after intravenous injection of 0.1 mmol/kg body weight of gadobenate dimeglumine. Postcontrast images were obtained in at least two planes. In MRI scan, tumor size and lymph node metastasis were studied. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I: Distribution of cases.

Age group (Years)	Males	Females	P value
20-40	14	7	0.01
40-60	32	15	0.04
>60	10	5	0.05
Total	56	28	

Table I shows that age group 20-40 years had 14 males and 7 females, 40-60 years had 32 males and 15 females and >60 years had 10 males and 5 females. The difference found to be significant (P< 0.05).

Table II: Distribution of cases based on site.

Site	Number	P value
Alveolus	42	0.01
Buccal mucosa	30	
Tongue	12	

Table II shows that 42 cases were of alveolus, 30 were of buccal mucosa and 12 of tongue. The difference found to be significant (P< 0.05).

Table III: Relationship between tumor thickness and lymph node metastasis for all level of lymph nodes.

Tumor size(cm)	Positive	Negative	Total
<2	10	5	15
2-3	12	6	18
>3	40	11	51
Total	62	22	84

Table III shows that lymph node metastasis was evident in 62 cases (73.8%), 40 cases were >3 cm (78.4%), 12 between 2-3 cm (66.7%) and 10 were <2 cm (66.7%).

Graph I: Relationship between tumor thickness and lymph node metastasis for all level of lymph nodes.

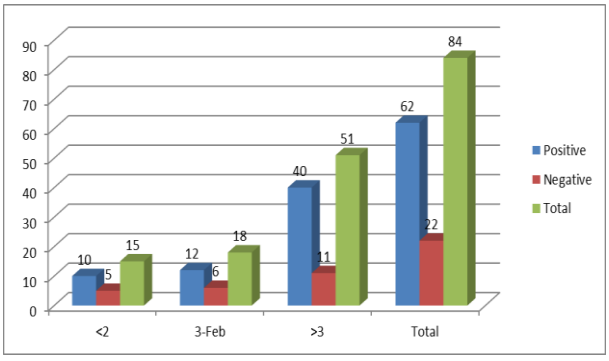

Table IV: Relationship between site and lymph node metastasis.

Site	Positive	Negative	Total
Alveolus	32	12	44
Buccal mucosa	21	9	30
Tongue	9	1	10
Total	62	22	84

Table IV, graph II shows that out of 44 cases of alveolus cancer, 32 (72.7%) showed positive results, 21 (70%) out of 30 buccal mucosa cancer showed positive results and 9 (90%) out of 10 tongue cancer showed positive metastasis.

Graph II Relationship between site and lymph node metastasis.

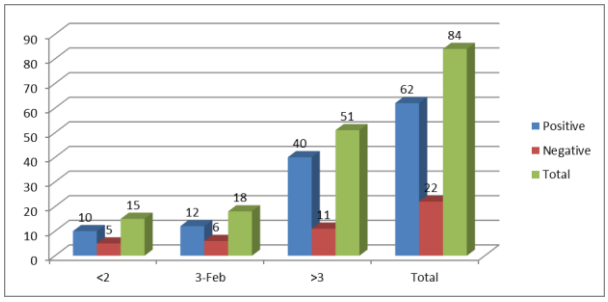

Table V: Correlation of tumor site and size and lymph node metastasis.

Metastasis	Size	Site
Pearson correlation	0.098	0.072
Sig (2- tailed)	0.041	0.052

Table V shows that there was positive Pearson's correlation of lymph node metastasis with size and site of tumor (P< 0.05).

DISCUSSION

Metastasis of oral cancer is a complex process involving detachment of cells from the tumor tissue, regulation of cell motility and invasion, proliferation and evasion through the lymphatic system or blood vessels. This process is due to reduced intercellular adhesion of tumor cells as they progress to malignancy because of loss of E-cadherin; they thereby begin to express proteins such as mesenchymal vimentin and N-cadherin, promoting cell elongation and interfering with cell polarity.[7] This morphological transition, called epithelial mesenchymal transition (EMT) leads to molecular alterations interfering with the behavior of these cells. The present was conducted to correlate the size and site of tumor with metastasis in study groups.

We found that out of 84 cases age group 20-40 years had 14 males and 7 females, 40-60 years had 32 males and 15 females and >60 years had 10 males and 5 females. Yuen et al[8] in their study found 40% cases were found to be true positive for detecting metastasis using clinical diagnostic criteria whereas 55% cases were found to be true positive for detecting metastasis using imaging criteria. The paired t-test value for the difference in tumor size between clinical and imaging staging was statistically significant (P < 0.01). The paired t-test value for the difference in lymph node size between clinical and imaging staging was, also, found to be statistically significant (P < 0.01). Overall specificity of 100%, sensitivity of 75%, positive predictive value 72%, negative predictive value 100% and accuracy of 85% were noticed for imaging staging.

In present study, 42 cases were of alveolus, 30 were of buccal mucosa and 12 of tongue. Lymph node metastasis was evident in 62 cases (73.8%), 40 cases were >3 cm (78.4%), 12 between 2-3 cm (66.7%) and 10 were <2 cm (66.7%). Out of 44 cases of alveolus cancer, 32 (72.7%) showed positive results, 21 (70%) out of 30 buccal mucosa cancer showed positive results and 9 (90%) out of 10 tongue cancer showed positive metastasis.

O-charoenrat P et al[9], conducted a study of the tumor thickness of primary tumor which was found to have a strong predictive value for occult cervical metastasis and poor outcomes in patients with oral squamous cell carcinoma (OSCC).

In present study, there was positive pearson's correlation of lymph node metastasis with size and site of tumor (P< 0.05). It is documented that at least 50% of patients with locally-advanced head and neck cancer develop locoregional or distant relapses, which are usually detected within the first two years of treatment. Investigators suggested that

squamous cell carcinoma of the upper aerodisgetive tract with parotid metastasis most often arises from the oral cavity or oropharynx. It has been postulated that unlike the parotid gland, the submandibular gland is unlikely to be the host tissue for metastasis because of its lack of lymph nodes and vessels. In fact, hematogenous spread of cancer may rise from tissues outside the head and neck region. In addition, unlike many other types of cancer, it characteristically metastasizes to the regional lymph nodes through the draining lymphatics in the early stages. Lymph node involvement is considered as the first indication for spread and a strong prognostic factor.[10] The shortcoming of the study is small sample size. Moreover, the correlation of staging, grading with tumor metastasis was not assessed.

CONCLUSION

A strong positive correlation of tumor size and site with tumor metastasis was observed. Tumor size measured on MRI can be used as a predictive indicator for cervical lymph node metastasis.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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