

## Original Article

### Correlation of Tumor Grading and Perineural Invasion with Metastasis- A Clinical Study

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#### ABSTRACT:

**Background:** The present study was conducted to assess correlation of tumor grading and perineural invasion with metastasis. **Materials & Methods:** The present study was conducted on 64 cases of both genders who were clinically and histopathologically diagnosed with oral squamous cell carcinoma. Incisional biopsy was taken for differentiation of the tumour. Clinical and radiological examination of the tumour regarding nodal involvement and metastasis was done and clinical TNM staging was noted. Assessment of perineural invasion was done. **Results:** Out of 64 patients, males were 41 and females were 23. Out of 64 cases, 34 (53%) had well differentiation, 24 (37.5%) had moderately differentiation and 6 (9.5%) had poorly differentiation. The difference was significant ( $P < 0.05$ ). Maximum lymph node metastasis was seen in poorly differentiated squamous cell carcinoma (67%) followed by moderately differentiation squamous cell carcinoma (33.3%) and well differentiation squamous cell carcinoma (26.5%). The difference was non-significant ( $P < 0.17$ ). 61% had positive perineural invasion, out of which 53.8% had positive lymph node metastasis. 39% had no perineural invasion and none had positive lymph node metastasis. The difference was significant ( $P < 0.05$ ). **Conclusion:** Maximum lymph node metastasis was seen in poorly differentiated squamous cell carcinoma. There was positive correlation of perineural invasion (PNI) to lymph node metastasis.

**Key words:** Lymph node metastasis, Squamous cell carcinoma, Tumour.

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#### INTRODUCTION

Overall, 57.5% of global head and neck cancers, excluding oesophageal cancers occur in Asia, especially in India, for both sexes. In India, Head and neck cancers account for 30% of all cancers in males. Tongue and mouth in males contribute to more than one-third of the total cancers. Among females, mouth cancer was the leading cause.<sup>1</sup> Oral cavity cancer is the 8th most common cancer in developed countries and 3rd most common cancer in

developing countries.<sup>2</sup> Squamous cell carcinoma (SCC) is the most common malignancy in the oral cavity, accounting for 95% of all oral cavity malignant lesions. The most common sites are tongue, gingivo-buccal mucosa complex, lower lip and floor of the mouth. Oral squamous cell carcinoma (OSCC) has a striking global incidence and equally formidable mortality rates. The worldwide mortality caused by cancer of the oral cavity and lip was estimated to be 128,000.<sup>3</sup>

Despite enormous advancements in the field of diagnostics and therapeutics, the overall survival rate in most countries ranges between 45% and 50% and has not shown a significant improvement during the past few decades.<sup>4</sup> At present, the clinical and histopathological parameters are mostly employed for the planning of treatment strategies as well as determining the prognosis of oral cancer patients.<sup>5</sup> The present study was conducted to assess correlation of tumor grading and perineural invasion with metastasis.

**MATERIALS & METHODS**

The present study was conducted in the department of Oral pathology & Microbiology. It comprised of 64 cases of both genders who were clinically and histopathologically diagnosed with oral squamous cell carcinoma. Ethical

clearance was obtained from institutional ethical committee. All patients were informed regarding the purpose of the study and written consent was obtained. General information such as name, age, gender etc. was recorded. History of tobacco and alcohol alcohol use was taken. Incisional biopsy was taken for differentiation of the tumour. Clinical and radiological examination of the tumour regarding nodal involvement and metastasis was done and clinical TNM staging was noted. Assessment of perineural invasion was done.

Results were tabulated and subjected to statistical analysis using SPSS version 21.0. Chi- square test and Pearson’s correlation was determined. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Total- 64		
Gender	Males	Females
Number	41	23

Table I shows that out of 64 patients, males were 41 and females were 23.

**Table II Histological grading of cases**

Grading	Number	Percentage	P value
Well differentiation	34	53	0.05
Moderately differentiation	24	37.5	
Poorly differentiation	6	9.5	

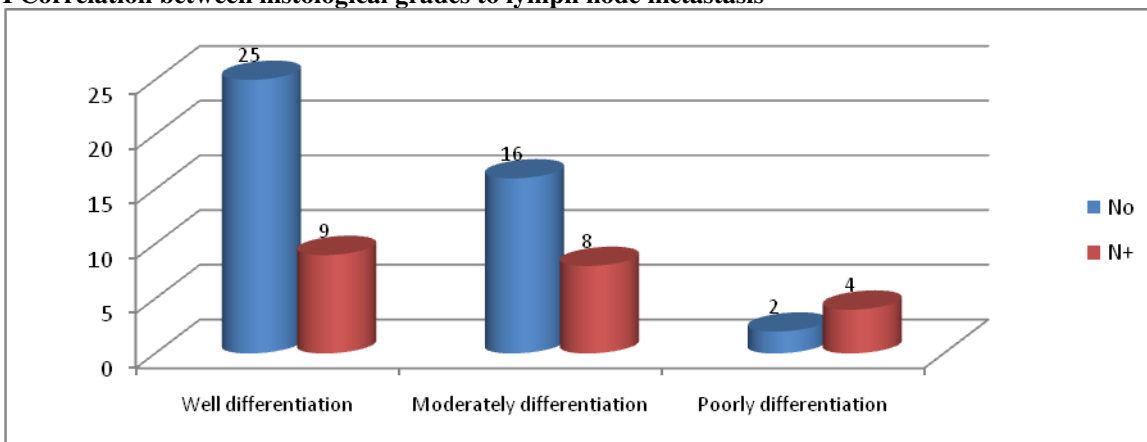
Table II shows that out of 64 cases, 34 (53%) had well differentiation, 24 (37.5%) had moderately differentiation and 6 (9.5%) had poorly differentiation. The difference was significant (P< 0.05).

**Table III Correlation between histological grades to lymph node metastasis**

Differentiation	N <sub>o</sub>	N+	P value
Well differentiation	25	9	0.17
Moderately differentiation	16	8	
Poorly differentiation	2	4	

Table III shows that maximum lymph node metastasis was seen in poorly differentiated squamous cell carcinoma (67%) followed by moderately differentiation squamous cell carcinoma (33.3%) and well differentiation squamous cell carcinoma (26.5%). The difference was non- significant (P< 0.17).

**Graph I Correlation between histological grades to lymph node metastasis**

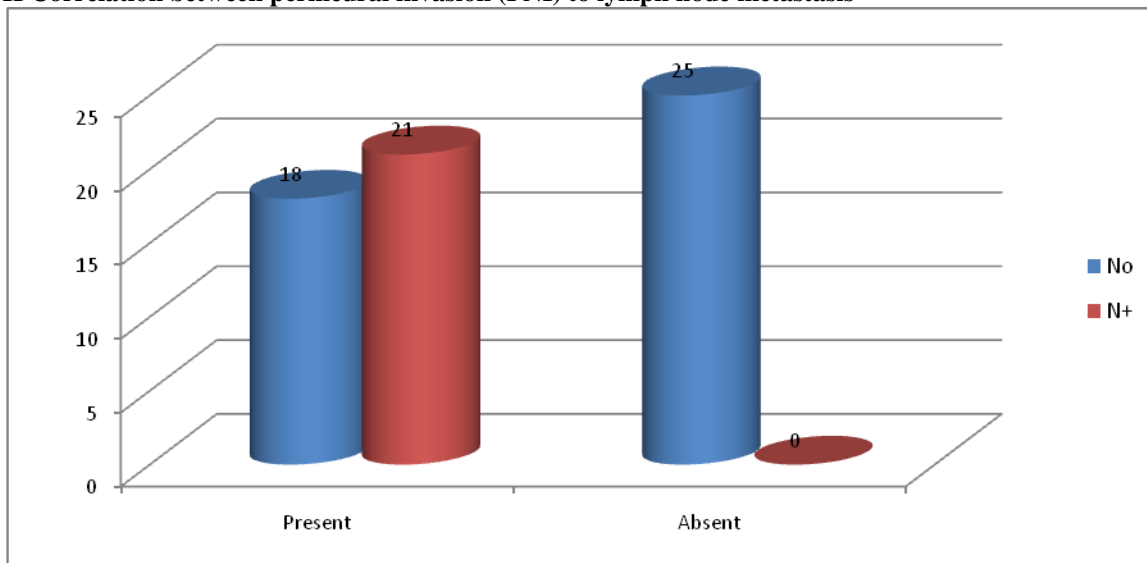


**Table IV Correlation between perineural invasion (PNI) to lymph node metastasis**

Perineural invasion	N <sub>0</sub>	N+	P value
Present	18	21	0.01
Absent	25	0	

Table IV shows that 61% had positive perineural invasion, out of which 53.8% had positive lymph node metastasis. 39% had no perineural invasion and none had positive lymph node metastasis. The difference was significant (P< 0.05).

**Graph II Correlation between perineural invasion (PNI) to lymph node metastasis**



**DISCUSSION**

The anatomic sites within the oral cavity exhibit variations in histology, vascular supply and lymphatic network. In addition to these factors, accessibility to visual examination of the site may further influence the early diagnosis of OSCC. The importance of the primary site of tumour and its role in survival has been emphasized in the literature.<sup>6</sup>

Vascular invasion is characterized by the presence of neoplastic cells within the lumen or in the wall of lymphatics and blood vessels, while perineural invasion denotes a tropism of neoplastic cells for nerve bundles. Various studies have suggested that both perineural and vascular invasion are the known predictors of poor outcome in OSCC patients.<sup>7</sup> The present study was conducted to assess correlation of tumor grading and perineural invasion with metastasis.

In present study, out of 64 patients, males were 41 and females were 23. We found that out of 64 cases, 34 (53%) had well differentiation, 24 (37.5%) had moderately differentiation and 6 (9.5%) had poorly differentiation. Viswanatha et al<sup>8</sup> in their study on 30 patients with T1 to T3, N0/+ oral tongue SCC. Majority presented with T2 stage. 27% had nodal metastasis. There was higher incidence of lymph node metastasis in moderately differentiated (MD) and poorly differentiated (PD) SCC which was not statistically significant. Significant correlation was seen between LVI and PNI to lymph node metastasis (p≤0.001).

We found that maximum lymph node metastasis was seen in poorly differentiated squamous cell carcinoma (67%) followed by moderately differentiation squamous cell carcinoma (33.3%) and well differentiation squamous cell carcinoma (26.5%). 61% had positive perineural invasion, out of which 53.8% had positive lymph node metastasis. 39% had no perineural invasion and none had positive lymph node metastasis. The difference was significant (P< 0.05).

Different grading systems for OSCC vary in their prognostic significance. Broder’s was the first grading system proposed for the prognosis of OSCC. However, a lack of correlation between Broder’s grades and prognosis has been observed. The main reason cited being, malignant squamous cells usually exhibit a heterogeneous population with differences in the degree of differentiation. Furthermore, tumour–host relationship is not considered in Broder’s grading and lastly, it is not a quantitative method. Adel M et al<sup>9</sup> in a study of 571 OSCC patients, it was observed that relative to vascular invasion, lymphatic invasion was significantly associated with poorer overall survival, disease-specific survival and disease-free survival. However, lymphatic invasion was not found to be an independent prognostic factor. Lim et al<sup>10</sup> showed no correlation between lymphovascular invasion and nodal metastasis in their study. Out of the 16% positive lymphovascular invasion, 30% had nodal metastasis, while among 84% of negative lymphovascular invasion, 44% had

positive nodal metastasis. The limitation of the study is small sample size.

## CONCLUSION

There was positive correlation of perineural invasion (PNI) to lymph node metastasis. Maximum lymph node metastasis was seen in poorly differentiated squamous cell carcinoma.

## REFERENCES

1. Tumuluri VR. A retrospective analysis of cell proliferation in human oral squamous cell carcinoma. Queen Elizabeth Research Institute for Mothers and Infants: University of Sydney; 1998.
2. Dantas DDL, Ramos CCF, Costa ALL, Souza LB, Pinto LP. Clinical-pathological parameters in squamous cell carcinoma of the tongue. *Braz Dent J.* 2003;14(1):22-5.
3. Grandi C, Alloisio M, Moglia D, Podrecca S, Sala L, Salatori P, et al. Prognostic significance of lymphatic spread in head and neck carcinomas: therapeutic implications. *Head Neck Surg.* 1985;8:67-73.
4. Kalnins IK, Leonard AG, Sako K, Razack MS, Shedd DP. Correlation between prognosis and degree of lymph node involvement in carcinoma of the oral cavity. *Am J Surg.* 1977;134:450-4.
5. Murakami R, Nakayama H, Semba A, et al. Prognostic impact of the level of nodal involvement: retrospective analysis of patients with advanced oral squamous cell carcinoma. *Br J Oral Maxillofac Surg* 2017; 55(1): 50-55.
6. Hasegawa T, Shibuya Y, Takeda D, et al. Prognosis of oral squamous cell carcinoma patients with level IV/V metastasis: an observational study. *J Cranio-Maxillof Surg* 2017; 45(1): 145-149.
7. Takahashi M, Aoki T, Nakamura N, et al. Clinicopathological analysis of 502 patients with oral squamous cell carcinoma with special interest to distant metastasis. *Tokai J Exp ClinMed* 2014; 39(4): 178-185.
8. Viswanatha SC, Hedne N, Hasan S. Correlation between histological grading, LVI and PNI of carcinoma oral tongue to lymph node metastasis. *Int J Otorhinolaryngol Head Neck Surg* 2019;5:159-64.
9. Adel M, Kao HK, Hsu CL, et al. Evaluation of lymphatic and vascular invasion in relation to clinicopathological factors and treatment outcome in oral cavity squamous cell carcinoma. *Medicine* 2015; 94(43): 1510.
10. Lim SC, Zhang S, Ishii G, Endoh Y, Kodama K, Miyamoto S, et al. Predictive markers for late cervical metastasis in stage I and II invasive squamous cell carcinoma of the oral tongue. *Clin Cancer Res.* 2004;10:166-72.

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