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Original Research Article

Correlation between pathological tumour stage and lymph node involvement in oral cancers: a descriptive study

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ABSTRACT

Background: Involvement of cervical lymph nodes is the single most important prognostic factor in oral carcinoma. This study was aimed to evaluate the correlation between tumour stage and lymph node metastasis.
Methods: A descriptive study was planned in oral cancer patients who fall within the inclusion criteria. This was compared with the postoperative histopathologic status of cervical nodes. Correlation analysis was done between tumor stage and lymph node metastasis.
Results: Total 106 patients were included in the study. The male female ratio was 1.4:1. Majority of the patients 37(34.9%) were in the sixth decade of life. Carcinoma of the tongue was present in 17 cases while only 4 had carcinoma of lower alveolus. Most of the patients with oral cancer presented at an early stage (T1-T2). Stage IV was the commonest with 51 (48.1%) patients. Level I was the most commonly involved lymph node station (78.1%) in squamous cell carcinoma of oral cavity. A weak significant positive correlation between tumor stage and lymph node metastases (r =0.298) was found (p = 0.002). There was a moderate significant (p = 0.0001) positive correlation (r = 0.435) between pathological tumour stage and level of lymph node involvement. But the positive correlation was not statistically significant in carcinoma of the lower alveolus (r = 0.387, p=0.112).
Conclusions: Significant positive correlation between pathological tumor stage and level of lymph node involvement in oral cancer and carcinoma tongue. But, in carcinoma lower alveolus the positive correlation was not significant.

Keywords: Cervical metastasis, Carcinoma tongue, Neck nodes, Oral cancer, Skip metastasis

INTRODUCTION

Oral cancer is the seventh most common cancer in the world. The annual estimated incidence is around 15 per 100,000 for oral cancers excluding nasopharynx, two-thirds of these cases occurring in developing countries.[1] Squamous cell carcinomas account for more than 90% of malignant tumors of the oral cavity. Oral cancers can occur de novo or from precursor lesions - leukoplakia and erythroplakia. Epithelial dysplasia in a non-homogenous leukoplakia is the most significant risk factor for malignant transformation in a leukoplakia. Tobacco is the most important factor, and more than 90% of patients have a history of smoking or chewing tobacco. Tobacco contains many carcinogenic molecules such as polycyclic hydrocarbons and nitrosamines. A clear dose-response relationship has been demonstrated between tobacco exposure and oral cancer.[2]

The single most important factor guiding the treatment for squamous cell carcinoma of the oral cavity is the presence of metastasis to neck nodes, and it is the most important prognostic factor in patients with squamous cell carcinoma of the oral cavity.[3] Detectable lymph node involvement is found in 50% of patients with oral cancer. Presence of nodal metastasis reduces the survival by

nearly 50%. Only 25-40% of patients with lymph node metastasis will achieve a 5-year survival, compared to approximately 90% of patients without metastasis. The risk of occult metastases is particularly high for cancers of the oral cavity. Spread of metastatic cancer to regional lymph nodes in the neck from oral cancer occurs in a predictable and sequential fashion. The distribution of neck node metastasis from squamous cell carcinoma at different subsites in the oral cavity has been described before.[4] Oral carcinoma mostly spreads through lymphatics like any other carcinoma. Undetected nodal metastasis is the commonest cause of treatment failure in oral cancer. Hence, regional control of nodal metastasis in the neck is an important factor in predicting the clinical course and outcome of the patient with oral cancer.[5] If regional node involvement is seen at initial examination or develops subsequent to initial therapy, the 5-year survival is generally significantly reduced.[6] This study was aimed to evaluate the correlation between tumour stage and lymph node metastasis.

METHODS

A descriptive study was planned in oral cancer patients who were treated during the period from January 2014 to June 2015 were included in the study.

Inclusion criteria

Previously untreated, histologically proven, squamous cell carcinoma of the oral cavity with a curative surgical intent on the primary tumour and neck nodes.

Exclusion criteria

- Non-squamous cell carcinoma,
- Patients who had undergone any sort treatment for oral cancer or any surgery in the neck,
- Those who were not fit for general anesthesia and those who had distant metastases.

Clinical examination of oral cavity and neck followed by imaging of 106 patients was done preoperatively. This was compared with the postoperative histopathologic status of cervical nodes, which was taken as the gold standard.

Sample size was calculated as 106 based on the assumptions that 76% prevalence of cervical lymph node metastases in oral cavity cancers, 50% prevalence of cervical lymph node metastases in oral tongue cancers with 80% power and 5% level of significance.

Study procedure

All patients who fall within the inclusion criteria, within the study setting and study duration will be included in the study. After getting an informed consent, a detailed clinical examination would be conducted. All necessary pre-operative investigations would be done, and the patients would be taken up for surgery that would include resection of the primary tumour and a neck dissection depending on the preoperative clinical examination, imaging reports and intraoperative findings. The resected specimen would be sent for detailed histopathological evaluation taking care to label the lymph nodes in the various levels of the neck separately.

Statistical analysis

Descriptive statistics such frequency, proportion, mean along with standard deviation will be used to study the presence of cervical lymph node metastases in different levels of the neck by clinical and histopathological examination. Spearman Rank correlation will be used to study the correlation between tumour stage and lymph node metastasis.

RESULTS

The study group consisted of 63 (59.4%) males and 43 (40.6%) females (Figure 1).

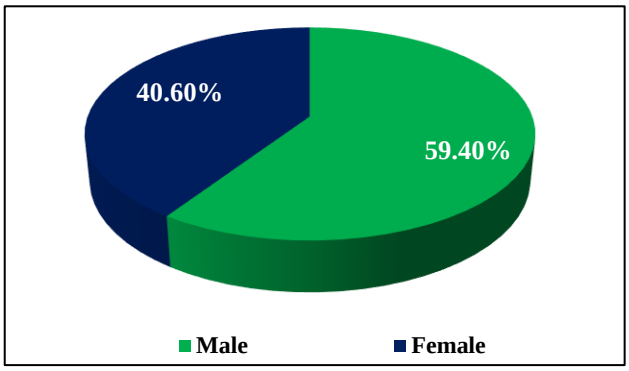

Figure 1: Distribution of gender.

Table 1: Premalignant lesions.

Premalignant condition/lesion	Frequency	Percentage
Leukoplakia	8	7.5%
OSMF	41	38.7%
Erythroplakia + OSMF	2	1.9%
Leukoplakia + OSMF	22	20.8%
Others	10	9.4%
Nil	23	21.7%
Total	106	100%

OSMF: Oral submucous fibrosis

The male female ratio was 1.4:1. Majority of the patients 37 (34.9%) were in the sixth decade of life. Of these, 17 had carcinoma of the tongue, 11 had carcinoma of buccal mucosa, 4 had carcinoma of lower alveolus and remaining 5 were comprised of the other sub sites together. Only two patients (1.9%) presented before the age of 30. The mean age of patients was found to be 61.6 with a range of 27 to 85 years. The mean age of age for patients with carcinoma buccal mucosa, tongue and lower

alveolus were 64.8years (range 39-84), 56.9years (range 27-75) and 63.4years (range 36-85) respectively. Among the habits of patients, 22 (20.8%) smoked only cigarettes while 6 (5.6%) smoked only beedis. Eighteen patients (17%) smoked cigarettes and beedis. Among the 106 patients, 44 (41.5%) of the patients presented with in 4 to 6 months of developing symptoms. Thirty-four (32.1%) patients presented within 3 months, 24 (22.6%) patients within 7 to 12 months and 4 (3.8%) patients within 13-24months of developing symptoms. The most common premalignant lesion, oral submucous fibrosis was found in 41(38.7%) patients (Table 1).

Among the 106 patients, carcinoma of the tongue was the commonest site in 45 (42.5%) patients followed by buccal mucosa 34 (32.1%) and lower alveolus 18 (17%). The remaining 9 (8.5%) patients included tumors of floor of mouth, upper alveolus and multiple sites (Table 2).

Table 2: Site of primary tumour.

Site	Frequency	Percentage
Buccal mucosa	34	32.1%
Tongue	45	42.5%
Lower alveolus	18	17%
Floor of mouth	4	3.8%
Upper alveolus	4	3.8%
Multiple sites	1	0.9%
Total	106	100%

In present study, there was statistically significant positive correlation between pathological T stage and pathological level of involvement of the neck nodes in oral cancer (r = 0.435, p=0.0001), carcinoma of the buccal mucosa (r = 0.536, p=0.001) and carcinoma of the tongue (r = 0.388, p=0.008). But the positive correlation was not statistically significant between pathological T stage and pathological level of involvement carcinoma of the lower alveolus (r = 0.387, p=0.112) (Table 3).

Table 3: Correlation of pathological T stage Vs pathological nodal level.

Site	Spearman rank correlation (r)	p value
Oral cancer	0.435	0.0001
Tongue	0.388	0.008
Buccal mucosa	0.536	0.001
Lower alveolus	0.387	0.112

DISCUSSION

Results of the present study reveal that a significant positive correlation between pathological T stage and pathological level of involvement in oral cancer and carcinoma tongue. But in carcinoma lower alveolus the positive correlation was not significant. Tankéré et al, demonstrated that there was a correlation between tumour stage and level of lymph node involvement in patients with oral cancer.[7] Most oral squamous cell carcinomas appear in older patients (sixth through eighth decade) and are believed to be related to a protracted conditioning period that is associated with environmental factors, especially tobacco chewing or smoking.[8] In present study, majority of the patients presenting with oral cancers were in the seventh decade of life irrespective of the site affected. The mean age of patients with oral cancer was 61.6years. Shah et al, has found mean age to be 60years in patients with oral cancer.[9] Furthermore, the mean age of patients reporting with oral cancer in Kerala was found to be 57.8years by Sankaranarayanan et al.[10]

Men are more commonly affected with oral cancer. The premalignant lesions present were leukoplakia, erythroplakia and oral submucous fibrosis. They were present either singly or in combination. The habits of patients included in the study are smoking, alcohol, pan parag, betel nut chewing and tobacco chewing. Cigarette smoking was the major contributing risk factor found in this study. Patients with oral cancer presented at an early stage (T1-T2). Patients with cancer of the tongue were the most common to report early when the lesion was relatively small (T2). Patients with cancer of the buccal mucosa too reported at an early stage, whereas patients with carcinoma of the lower alveolus presented at an advanced stage. This could be attributed to the functional importance of the tongue. Even a small growth or ulcer causes discomfort when it occurs on the tongue. These results are contrary to that of Pradhan SA, who reported buccal mucosa cancer to be common in India with T4 tumours being the most common.[11] Nodal metastasis occurs when tiny microscopic groups of tumour cells at the primary site gain access to lymphatic vessels and is carried as emboli in the lymph stream until they get lodged within a lymph node where they gradually grow. Nodal metastasis was histologically detected in 32 (30.2%) of the 106 patients with oral cancer. Lee et al, reported the incidence of neck metastasis in oral SCC to be as high as 34-50% which is comparable to present study.[12] Woolgar JA, reported lymph node metastasis from oral SCC to be 47%.[13] Most of the patients presented within 4 to 6months of developing symptoms and they are presented in an advanced stage clinically. Stage IV was the commonest with 51 (48.1%) patients. Pathologically level I (78.1%) was the most commonly involved lymph node station in patients with oral cancer. Level I was the commonest station involved in carcinoma of buccal mucosa and lower alveolus. Level V was the commonest station involved in carcinoma tongue which we attribute to a sampling error. Drawbacks of this study were the sampling error during neck dissection which we attribute to the increased incidence of level V metastases and our small sample size.

CONCLUSION

The positive correlation was significant between tumor stage and lymph node metastases in oral cancer.

However, the positive correlation was not significant in carcinoma of lower alveolus.

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