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| **Original Article** |

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| **Oral Squamous Cell Carcinoma** |

**Evaluation of Staging of Oral Squamous Cell Carcinoma**

**Raja Muhammad Daniyal1, Jehan Alam1, Tariq Mahmood2, Ambreen Mahboob1, Sumaira Babar2 and Ghulam Shabbir3**

**ABSTRACT**

**Objective:** To evaluate the potential impact of TNM classification in determination of staging of oral squamous cell carcinoma and consequent treatment.

**Study Design:** Retrospective study

**Place and Duration of Study:** This study was conducted at the Oral & Maxillofacial Surgery and Radiology departments of Jinnah Postgraduate Medical Center, Karachi from January 2018 to June 2021.

**Materials and Methods:** A total of 343 patients of squamous cell carcinoma of oral cavity were included. Main variables of study were stage of OSCC based on TNM7 classification which was performed on CT scan imaging of the head and neck with contrast, and site of carcinoma. Data stratification was done by using SPSS version 24. Frequency percentages and mean standard deviations were calculated.

**Results:** The most common tumor category was T2 and T4a, 37.0% and 33.8%, respectively. Most common node category was N0 and N1, 53.3% and 42.0%, respectively. Mostly distant metastasis was not evaluated Mx, 78.7%. Buccal mucosa and tongue were the most common cancer sites being 46.7% and 44.0%, respectively. Majority of the patients had stage 3 and stage 4a cancers, 36.2% and 30.8% respectively.

**Conclusion:** This study is a reflection of current practices in JPMC. It reflects the use of TNM7 staging which has now been updated by TNM8 edition. Lack of local staging using MRI with contrast leads to incorrect staging as far as invasion of essential structures are concerned which are better demonstrated on MRI due to higher soft tissue contrast resolution. Lack of HPV testing in or pharyngeal cancers which are required in TNM8 edition and variable practices which do not necessarily work up patients for distant staging as reflected in this study.

**Key Words:** Cancer stage, oral squamous cell carcinoma, TNM classification

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**INTRODUCTION**

Oral cancer or cancer of the mouth is a serious health problem that causes increased mortality and mortality. A recent global survey reported 177,384 deaths every year from 354,864 new cases1. Most common causes of oral cancer are alcohol abuse and tobacco use. Among oral cancers squamous cell carcinoma (OCSCC) is most common and its incidence rate is increasing in young population2. But on comparison between old and young patients there was no significant difference was observed regarding grade and stage of OSCC3.

Tongue is more prone and associated with high rate of OSCC for two main reasons, firstly due to pooling of

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carcinogen with saliva in the floor of mouth second reason is repeated trauma from sharp cusps of tooth. Other common subsites include buccal mucosa, gingivae, retromolar trigone and floor of mouth. Management options of OSCC include surgical excision along with chemotherapy, radiotherapy or chemo radiotherapy4,5. Adjuvant therapy is usually recommended after histopathology of resected sample based on the degree of differentiation, excision margins, depth of invasion, bone involvement, vascular invasion, number of lymph nodes, extra capsular spread of disease, size of metastasis and staging6.

TNM staging is based on primary tumor size (T), locoregional lymph node involvement (N), and metastasis (M). Treatment planning, recurrence risk prediction, and survival rate can be better estimated using the TNM classification system8.

Several modifications have been made since the development of TNM system about 60 years ago but primary goal of development (AJCC and UICC) remains the same. Among malignant neoplasm of oral cavity squamous cell carcinoma comprise 90% of cancers with neoplasms of minor salivary glands comprising 10%.

**MATERIALS AND METHODS**

Study was retrospective in design and was conducted after taking permission from department of radiology in Jinnah Postgraduate Medical Center, Karachi. Study was conducted using patient records and included those that were diagnosed with oral squamous cell carcinoma. Patients diagnosed as SCC on biopsy samples of oral cavity. Furthermore, staging of disease was done using TNM7 classification.

SPSS version 23 was used for data entry and analysis. Proportions or frequency percentages were calculated for qualitative variables like gender and mean SD were calculated for quantitative variables like age of patients. Test of significance was applied and p value ≤0.05 was taken as significant.

**RESULTS**

Three hundred & forty-three patients were enrolled, in our study. The average age of the patients was 57.67±10.99years. Majority of the patients, 183 (53.4%) were between 36-60 years of age. There were 260 (75.8%) males and 83 (24.2%) were females. Most of the patients lived in urban areas 250 (72.9%).   
(Table. I).

**Table No.1: Demographic and socioeconomic characteristics of the patients**

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| --- | --- | --- |
| Characteristic | Mean±S.D | N (%) |
| Age (years) | **57.67±10.99** |  |
| ≤18 |  | 0 (0.0) |
| 19-35 |  | 12 (3.5) |
| 36-60 |  | 183 (53.4) |
| >60 |  | 148 (43.1) |
| Sex | | |
| Male |  | 260 (75.8) |
| Female |  | 83 (24.2) |
| Area of residence | | |
| Urban |  | 250 (72.9) |
| Rural |  | 93 (27.1) |

**Table No.2: Presence of tumor category among the study patients**

|  |  |  |
| --- | --- | --- |
| Tumor category | N | % |
| Tx | 1 | 0.3 |
| T0 | 0 | 0.0 |
| Tis | 0 | 0.0 |
| T1 | 45 | 13.1 |
| T2 | 127 | 37.0 |
| T3 | 53 | 15.5 |
| T4a | 116 | 33.8 |
| T4b | 1 | 0.3 |
| Total | 343 | 100.0 |

The most common tumor category was T2 and T4a, 127 (37.0%) and 116 (33.8%), respectively. (Table. 2). The most common node category was N0 and N1, 183 (53.3%) and 144 (42.0%), respectively. (Table. 3). Most of the patients were not worked up for distant metastasis Mx, 270 (78.7%). (Table. IV). Buccal mucosa and tongue were the most common cancer sites, 160 (46.7%) and 151 (44.0%), respectively. (Table. V). Majority of the patients had stage 3 and stage 4a cancers, 124 (36.2%) and 106 (30.8%), respectively (Table. 4).

**Table No.3: Presence of node category among the study patients**

|  |  |  |
| --- | --- | --- |
| Node category | N | % |
| NX | 4 | 1.2 |
| N0 | 183 | 53.3 |
| N1 | 144 | 42.0 |
| N2 | 0 | 0.0 |
| N2a | 8 | 2.3 |
| N2b | 0 | 0.0 |
| N2c | 1 | 0.3 |
| N3 | 3 | 0.9 |
| Total | 343 | 100.0 |

**Table No.4: Distant metastasis category among the study patients**

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| --- | --- | --- |
| Metastasis category | N | % |
| Mx | 270 | 78.7 |
| M0 | 63 | 18.4 |
| M1 | 10 | 2.9 |
| Total | 343 | 100.0 |

**Table No.5: Cancer sites among the study patients**

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| --- | --- | --- |
| Site | N | % |
| Buccal mucosa | 160 | 46.7 |
| Tongue | 151 | 44.0 |
| Hard palate | 26 | 7.6 |
| Retromdartrigone | 6 | 1.7 |
| Total | 343 | 100.0 |

**Table No.6: Cancer stages among the study patients**

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| --- | --- | --- |
| Stage | N | % |
| Stage 0 | 0 | 0.0 |
| Stage 1 | 34 | 9.9 |
| Stage 2 | 65 | 19.0 |
| Stage 3 | 124 | 36.2 |
| Stage 4a | 106 | 30.8 |
| Stage 4b | 4 | 1.2 |
| Stage 4c | 10 | 2.9 |
| Total | 343 | 100.0 |

**DISCUSSION**

Patients of oral squamous cell carcinoma have varied prognosis because of variation in clinical features and histology11. TNM system has been adopted for histological staging and planning for treatment evaluation of patients. In patients with advance stages of tumor prognosis is poor. In this study few clinical findings were discussed and evaluated that can help a practitioner in treatment planning12.

In our study 75.8% were male and 24.2% were female having overall mean age of 57.67±10.99. A study was conducted by Costa ALL et al13 in 2005 on 55.2% male patients with age range 50-70 years and reported that borders of the tongue was the most common site (19 patients) followed by the lower lip (10 patients). Another study was conducted by Woodhouse EC et al14 and described the mechanism involved in metastasis and described that pattern of metastasis can be explained with TNM classification system.

It is difficult to assess infiltration of adjacent structures on clinical examination and therefore imaging helps in the evaluation of disease extent which cannot be seen with the naked eye or on endoscopy, especially muscle involvement, bone erosion, vascular encasement and perineural extension5. Accuracy of TNM was reported upto 80% when gold standard was taken as magnetic resonance imaging (MRI) and computed tomography (CT) for staging of neoplasms15. In our study T3 pattern was observed in 15.5% of cases and T4 in 34% of patients. N0 was noted in a high proportion 53.3% of cases.

A study was conducted by Lopes et al16 in 2002 showing T1/T2N? tumors in majority and T3/T4N0 were observed in 65% of cases with invasive pattern. Results were statistically significant p<0.05. In a study conducted by Garavello et al17 on squamous cell carcinoma patients distant metastasis M1 was observed in 9.2% of SCC patients and most of them were younger (below 45 years) in age. In our study distant metastasis M1 was observed in 2.9% patients of squamous cell carcinoma which is likely an under estimation since a large majority were not evaluated for distant staging.

Brougham et al18 carried out a study on squamous cell carcinoma patients and observed cheeks and lips were most common primary sites and mean age of patients was 74 years. Daniyal et al19 carried out a study on distant metastasis in SCC patients and reported that in a major portion of squamous cell carcinoma developing distant metastasis, T3 was the most common stage of metastasis 41.8% followed by T4a. Most common M stage was M0 in 43.6% of cases.

**CONCLUSION**

This study is a reflection of current practices in JPMC. It reflects the use of TNM7 staging which has now been updated by TNM8 edition. Lack of local staging using MRI neck with contrast for suprahyoid cancers which leads to incorrect staging as far as invasion of essential structures are concerned which are better demonstrated on MRI due to higher soft tissue contrast resolution. Lack of HPV testing in oropharyngeal cancers which is required in TNM8 edition. And variable practices which do not necessarily work up patients for distant staging as reflected in this study. This can be due to lack of awareness by the clinicians, resource constraints of the current health infrastructure such as lack of sufficient MRI scanners and sufficient centres with HPV testing, or financial constraints of the patients as JPMC caters to mainly the lower socio economic class and the healthcare costs are borne out of the patient’s pocket.

The limiting factors need to be identified and consequently rectified to improve staging and subsequent management of head and neck cancer patients.

**Author’s Contribution:**

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| Concept & Design of Study: | Raja Muhammad Daniyal |
| Drafting: | Jehan Alam, Tariq Mahmood |
| Data Analysis: | Ambreen Mahboob, Sumaira Babar, Ghulam Shabbir |
| Revisiting Critically: | Raja Muhammad Daniyal, Jehan Alam |
| Final Approval of version: | Raja Muhammad Daniyal |

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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