Evaluation of Staging of Oral Squamous Cell Carcinoma

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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

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 cases[1]. 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 population[2]. But on comparison between old and young patients there was no significant difference was observed regarding grade and stage of OSCC[3].

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 radiotherapy[4,5]. 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 staging[6].

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 system[8].

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

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

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

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

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 histology[11]. 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 planning[12].

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 al[13] 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 al[14] 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 extension[5]. Accuracy of TNM was reported upto 80% when gold standard was taken as magnetic resonance imaging (MRI) and computed tomography (CT) for staging of neoplasms[15]. 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 al[16] 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 al[17] 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 al[18] 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 al[19] 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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REFERENCES

1. Curado MP, Johnson NW, Kerr AR, Mendonça e Silva DR, Lafranchi H, Pereira DL, et al. Oral and oropharynx cancer in South America: incidence, mortality trends and gaps in public databases as presented to the Global Oral Cancer Forum. Transl Res Oral Oncol 2016;1:1-7.

2. Ferlay J, Colombet M, Soerjomataram I, Mathers C, Parkin DM, Piñeros M, et al. Estimating the global cancer incidence and mortality in 2018: GLOBOCAN sources and methods. Int J Cancer 2019;144(8):1941-53.

3. Nóbrega TD, Queiroz SI, Santos EM, Costa AL, Pereira-Pinto L, Souza LB. Clinicopathological evaluation and survival of patients with squamous cell carcinoma of the tongue. Med Oral Patol Oral Cir Bucal 2018;23(5):e579-87.

4. Rodrigues RM, Bernardo VG, Da Silva SD, Camisasca DR, Faria PA, Dias FL, et al. How pathological criteria can impact prognosis of tongue and floor of the mouth squamous cell carcinoma. J Appl Oral Sci 2019:28;28.

5. Beltz A, Gösswein D, Zimmer S, Limburg I, Wünsch D, Gribko A, et al. Staging of oropharyngeal squamous cell carcinoma of the head and neck: Prognostic features and power of the 8th edition of the UICC staging manual. Eur J Surg Oncol 2019;45(6):1046-53.

6. Bander TS, Nehal KS, Lee EH. Cutaneous squamous cell carcinoma: updates in staging and management. Dermatol Clin 2019;37(3):241-51.

7. Zanoletti E, Franz L, Favaretto N, Cazzador D, Franchella S, Calvanese L, et al. Primary temporal bone squamous cell carcinoma: Comparing the prognostic value of the American Joint Committee on Cancer TNM classification with the revised Pittsburgh staging system. Head Neck 2022;44(4):889-96.

8. Kano S, Sakashita T, Tsushima N, Mizumachi T, Nakazono A, Suzuki T, et al. Validation of the 8th edition of the AJCC/UICC TNM staging system for tongue squamous cell carcinoma. Int J Clin Oncol 2018;23(5):844-50.

9. Denaro N, Russi EG, Merlano MC. Pros and cons of the new edition of TNM classification of head and neck squamous cell carcinoma. Oncol 2018;95(4):202-10.

10. Nauta IH, Rietbergen MM, Van Bokhoven AA, Bloemena E, Lissenberg-Witte BI, Heideman DA, et al. Evaluation of the eighth TNM classification on p16-positive oropharyngeal squamous cell carcinomas in the Netherlands and the importance of additional HPV DNA testing. Ann Oncol 2018;29(5):1273-9.

11. Hermanck P, Sobin HL, Fleming DI. What do we need beyond TNM? Cancer 1996;77: 185-92.

12. Bryne M, Koppang HS, Lilleng R. New malignancy grading is a better prognostic indicator than "Broders" grading in oral squamous cell carcinomas. J Oral Pathol Med 1989;18:432-7.

13. Costa, Antonio de LL, Júnior Raimundo F, de Araújo Ramos Carlos CF. Correlation between TNM classification and malignancy histological feature of oral squamous cell carcinoma. Brazilian J Otorhinolaryngol 2005;71(2):181–187.

14. Woodhouse EC, Chuaqui RF, Liotta LA. General mechanisms of metastasis. Cancer: Interdisciplinary. Int J Am Cancer Society 1997; 80(S8):1529-37.

15. Lydiatt WM, Patel SG, O'Sullivan B, et al. Head and Neck cancers—major changes in the American Joint Committee on Cancer eighth edition cancer staging manual. CA Cancer J Clin 2017;67: 122–37.

16. Lopes MA, Nikitakis NG, Reynolds MA, Ord RA, Sauk J. Biomarkers predictive of lymphonode metastases in oral squamous cell carcinoma. J Oral Maxillofac Surg 2002;60:142-7.

17. Garavello W, Ciardo A, Spreafico, Gaini RM. Risk factors of distant metastasis in head and neck squamous cell carcinoma. Arch Otolaryngol Head Neck Surg 2006;132;762–66.

18. Brougham ND, Dennett ER, Cameron R, Tan ST. The incidence of metastasis from cutaneous squamous cell carcinoma and the impact of its risk factors. J Surg Oncol 2012;106(7):811-5.

19. Daniyal RM, Alam J, Mahboob A, Mahmood T, Babar S, Siraj U. Incidence of Distant Metastasis in Oral Squamous Cell Carcinoma on 18f FDG PET CT Scan. Med Forum 2022;33(3):96-99.