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Original Research Paper

Histopathology

COMPARISON OF CLINICAL PARAMETERS WITH STAGING AND MICROSCOPIC GRADING OF VARIOUS MALIGNANCIES IN HEAD AND NECK REGION

Dr.J.Amudha	Asst.Professor of Pathology
Dr. S.C.Sivaranjani	Asst Professor of Pathology
Dr.K.R.Mohan	Professor of Pathology
Dr.R. Sathyalakshmi*	Associate Professor of Pathology. *Corresponding Author

ABSTRACT

BACKGROUND Head and neck cancer (HNC) are emerging as a major public health problem in India. They have distinct demographic profile, varied risk factors like food habits, background of family and personal history. In the early stages, clinical staging and microscopic grading aid in precise outcome of the head and neck cancer and treatment method to be adopted.

AIM The aim of this study is to correlate the clinical staging with the microscopic grading among patients with head and neck malignancies.

METHODS This study was conducted in Chengalpattu Medical College and Hospital as a prospective and retrospective record based study among patients with Head and Neck malignancy. Patients presented with recurrence tumor were excluded. A total of 105 head and neck cancer cases for which biopsy blocks were retrieved from the Department of Pathology. Sections were studied and graded by malignancy grading criteria and TNM staging criteria. Data analysis was done by SPSS Version 20 and correlation was considered with p value <0.05.

RESULTS Head and Neck Cancer occur mostly in the age group of 50-60 years (28.6%) with male predominance (76.2%). The common site of Head and Neck Cancer was found to be tongue (34.3%). Patients with clinical stage IV A were 38.1% and microscopic grading moderately differentiated were 62.9%. There was no statistical significance found for correlating the clinical staging and microscopic grading (p value = 0.567) as only small biopsy specimens were studied.

CONCLUSION Though small biopsies help in early diagnosis of Head and neck cancer , no statistical correlation was found between clinical staging and microscopic grading in our study. Hence it is recommended to study the surgically resected tumor specimens as histologically invasive areas is responsible for clinical behavior and may be important to predict the prognosis of cancer and implicate cancer treatment modality.

KEYWORDS : Head and Neck tumors, Microscopic grading, Staging

INTRODUCTION

Head and neck cancer (HNC) are emerging as a major public health problem in India, due to varied lifestyle related factors. They have distinct demographic profile, varied risk factors, food habits and a background of family and personal history.[1] In 2020, head and neck cancer (HNC) is expected to affect approximately 833,000 new patients worldwide. Cancer mortality due to head and neck cancers (HNC) in India constitutes nearly 28% of the world's mortality and 71% of the mortality in the South East Asia region.[2]

With 77,000 new cases diagnosed per year, HNCs are the second most common cancers in the Indian population.[3] Head and Neck cancer in India accounts for 30% males and 11 to 16% females except in Assam where it is 49.6%[4]. Most of the oral lesions are detected in their advanced stages although the oral cavity is accessible for visual examination. 60-80% of patients present with advanced disease in India, as compared to 40% in developed countries.[5]

Malignancies that are known collectively as head and neck cancers usually begin in the squamous cells lining the moist, mucosal surface. Cancers of the head and neck are further categorized by the area of the head or neck in which they begin like oral cavity, pharynx, larynx, paranasal sinuses, nasal cavity and salivary glands.

In India, oral cavity is one of the five leading sites of cancer.[6] Squamous cell carcinoma (SCC) of the buccal mucosa (BM), alveolus, and retromolar trigone together grouped as gingivo-buccal complex, aptly called as the "Indian Oral Cancer", constitute 60% of oral cancer in India.[7] Despite the therapeutic and diagnostic progresses in oncology, the clinical outcome of intraoral cancer has remained poor.[8] Patients with oral squamous cell carcinoma (OSCC) can die from failure to control the primary lesion or regional lymph node (LN) and distant metastasis.[9] Regional lymph node involvement is an important prognostic factor.

Alcohol and tobacco use (including smokeless tobacco, sometimes called "chewing tobacco" or "snuff") are the two most important risk factors for head and neck cancers.[10,11] At least 75% of head and neck cancers are caused by tobacco and alcohol use.[12] HNC cancers are more than twice as common among men as they are among women and also diagnosed more often among people over age 50 than they are among younger people.[13]

Mostly TNM staging system has been used clinically estimated response to therapy and survival. It has been found to be especially reliable prognostic factor. In early cases of oral squamous cell carcinoma, however, there are many patients who die despite the fact that their neoplasm was considered clinically to be stage I and II and were treated accordingly. In such patient a combined assessment of clinical staging and of cytomorphology of neoplasm might serve as more precise measure for predicting the outcome of neoplasm and for determining their treatment.[14]

A combined assessment of clinical staging and microscopic grading may serve as a more precise measure for predicting the outcome of head and neck malignancy. Hence this study was conducted to find the utmost importance to know the potential extent of disparity that exists between pathological and clinical staging methods, so that the prognosis and outcome of disease can be predicted and managed.

OBJECTIVE

To correlate the clinical parameters and staging with the

microscopic grading among patients with head and neck malignancies.

METHODS

The study was conducted in Chengalpattu Medical College and Hospital as a prospective and retrospective record based study among patients who were diagnosed with Head and Neck malignancy. The study period was four months.

Inclusion Criteria:

All patients with head and neck malignancy

Exclusion Criteria:

Patients with recurrence of tumor in head and neck region .

Malignancy in other sites Institutional ethics committee approval was obtained. A total number of 105 newly diagnosed head and neck cases were selected and biopsy blocks were collected from the Department of Pathology, along with patients age, sex and site of the tumor from the register. All these samples were graded according to the prescribed malignancy grading criteria and TNM staging criteria.

Statistical Analysis

Statistical Package for Social Sciences (SPSS for Windows V20) was used for data analysis. All descriptive data were described as frequency and percentage. P value <0.05 were considered for statistical significance to find out the correlation between clinical parameters, staging and microscopic grading of head and neck malignancy.

RESULTS

The study was done to find the clinical parameters and staging with the microscopic grading among patients with head and neck malignancies at Chengalpattu Medical College Hospital.

According to SS Rahman et al (27) and Ken Russell Coelho et al (28) incidence of oral cancer increases by age and most commonly occur in fifth decade. In our study, around 28.6% of cases were found to be between the age group of 51-60 years and 17.1% of the study patients were below 40 years of age.

Table 1: Age distribution of the participants

AGE GROUP	FREQUENCY (No of patients)	PERCENTAGE
<40 years	18	17.1
41-50 years	23	21.9
51-60 years	30	28.6
61-70 years	24	22.9
>70 years	10	9.5

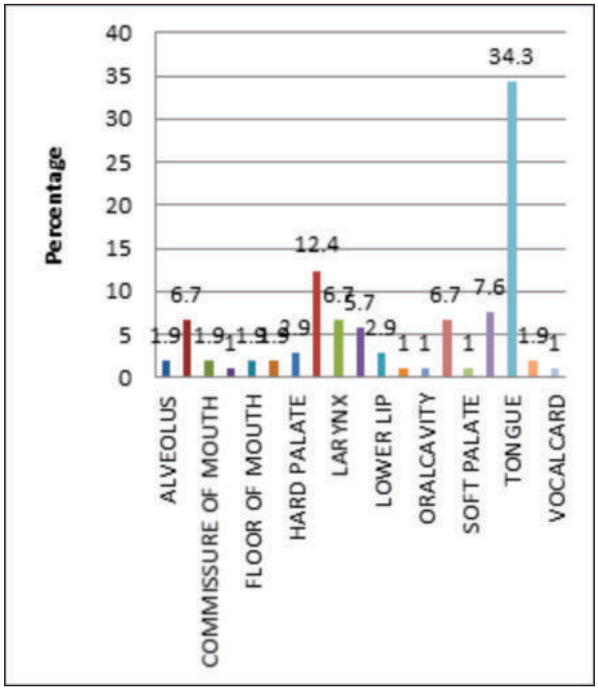
According to Sree Vidya Krishna Rao, Gloria Mejia, Kaye Roberts- Thomson et al (29) men are two to three times more affected. In our study head and neck malignancy were more common in males (78.2%).

Table 2: Sex distribution of the participants

GENDER	NO OF PATIENTS	PERCENTAGE
Female	25	23.8
Male	80	76.2

According to varshitha et al the most common site of malignancy is tongue. In our study, the most common site of malignancy was found to be tongue (34.3%) followed by hypo pharynx (12.4%). Supra glottis, buccal mucosa, larynx and orophayngeal site malignancy was found in 7.6%, 6.7%, 6.7% and 6.7% patients respectively. Nasopharyngeal, oral cavity, vocal cord, epiglottis site tumor was found to be 1% each.

Figure 1: Proportion of participants with tumors in various sites



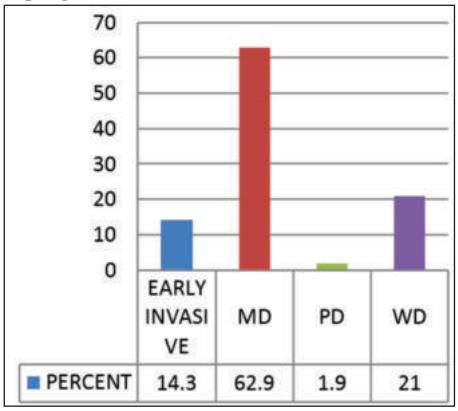
In this present study 38.1% of the patients were found in IVA clinical stage of the disease whereas 22.9% were found in stage ii disease. In stage I and IVC 4.8% and 1% patients were found respectively.

Table 3: Proportion of participants with respect to clinical staging

CLINICAL STAGE	FREQUENCY	PERCENT
I	5	4.8
II	24	22.9
III	18	17.1
IVA	40	38.1
IVB	17	16.2
IVC	1	1.0

Most of the patients (i.e 62.9%) in our study were found to be in Moderately Differentiated microscopic grading whereas 21% were found to be Well Differentiated. Poorly Differentiated was found in 1.9% patients.

Figure 2: Proportion of participants with respect to microscopic grades



WD- Well differentiated, MD- Moderately differentiated, PD- Poorly differentiated.

There was no correlation found between age group and microscopic grading. The p value was found to be statistically

not significant. (p value >0.05). Likewise in the correlation of sex and microscopic grading there was no statistical significance (p value >0.05)

Table 4: Association between various factors and microscopic grading

AGE	MICROSCOPIC GRADING				p value
	early invasive	WD	MD	PD	
<40	4(3.8)	2 (1.9)	12 (11.4)	0(0)	0.59
41-50	2(1.9)	6(5.7)	15 (14.3)	0(0)	
51-60	5(4.8)	8 (7.6)	17 (16.2)	0(0)	
61-70	2(1.9)	4 (3.8)	17 (16.2)	1(1.0)	
>70	2(1.9)	2 (1.9)	5 (4.8)	1(1.0)	
Gender					
Female	6(5.7)	12 (11.4)	1 (1.0)	6(5,7)	0.23
Male	9(8.6)	54 (51.4)	1 (1.0)	16(15.2)	

In this study there was no statistical association found between the site of the lesion and the microscopic grading, the p value was found to be 0.104

Table 5: Association between various sites of tumors and microscopic grading

SITE	MCGRADING				p value
	EARLY INVASIVE	MD	PD	WD	
ALVEOLUS	0(0)	1(1.0)	1(1.0)	0(0)	0.104
BUCCAL MUCOSA	1(1.0)	4 (3.8)	0(0)	2 (1.9)	
COMMISSURE OF MOUTH	1(1.0)	1 (1.0)	0(0)	0(0)	
EPIGLOTIS	0(0)	0(0)	0(0)	1 (1.0)	
FLOOR OF MOUTH	1(1.0)	0(0)	0(0)	1 (1.0)	
GLOTIS	0(0)	2 (1.9)	0(0)	0(0)	
HARD PALATE	0(0)	3 (2.9)	0(0)	0(0)	
HYPOPHARYNX	1(1.0)	10 (9.5)	0(0)	2 (1.9)	
LARYNX	0(0)	7 (6.7)	0(0)	0(0)	
LOWER ALVEOLUS	2(1.9)	1 (1.0)	0(0)	3 (2.9)	
LOWER LIP	1(1.0)	2 (1.9)	0(0)	0(0)	
NASOPHARYNX	0(0)	1 (1.0)	0(0)	0(0)	
ORALCAVITY	0(0)	0(0)	0(0)	1 (1.0)	
OROPHARYNX	0(0)	7 (6.7)	0(0)	0(0)	
SOFT PALATE	0(0)	1 (1.0)	0(0)	0(0)	
SUPRAGLOTIS	0(0)	5 (4.8)	0(0)	3 (2.9)	
TONGUE	8(7.6)	18 (17.1)	1 (1.0)	9 (8.6)	
TONSIL	0(0)	2 (1.9)	0(0)	0(0)	
VOCALCARD	0(0)	1 (1.0)	0(0)	0(0)	

Clinical staging and microscopic grading was found to be not statistically significant (p value >0.05).

Table 6: Association between clinical staging and microscopic grading

CLINICAL STAGE	MC GRADING				p value
	EARLY INVASIVE	MD	PD	WD	
I	2(1.9)	2 (1.9)	0 (0)	1(1.0)	0.567
II	5(4.8)	13 (12.4)	0 (0)	6(5.7)	
III	3(2.9)	12 (11.4)	0 (0)	3(2.9)	
IVA	5(4.8)	23 (21.9)	2 (1.9)	10(9.5)	
IVB	0(0)	15 (14.3)	0 (0)	2(1.9)	
IVC	0(0)	1(1.0)	0 (0)	0(0)	

DISCUSSION

For many years, TNM staging system has been used to clinically estimate response to therapy and survival. Broder[15] first initiated histological quantitative grading of cancer based on the proportion of the neoplasm resembling normal squamous epithelium. Many workers have devised histological grading systems to predict the biological behavior of oral carcinoma. A lack of correlation between Broder's degree of differentiation and prognosis was one of main reason being that squamous cell carcinoma usually exhibits a heterogeneous cell population with difference in degree of differentiation.

Later Jakobbson et al[16] (1973) brought a system which not only includes the morphologic parameters "structure", "tendency to keratinization", "nuclear aberrations", and "number of mitosis", but also an evaluation of tumor-host relationship as estimated by parameters such as "mode," "stage of invasion", "vascular invasion" and "degree of lymphoplasmocytic infiltration"

Lund et al[17] (1975) modified grading system of Jakobsson et al. by presenting a more exact definition of each parameter and grade and by introducing a histological score, defined a total sum of points divided by the number of parameters evaluated.

Bryne M. et al[18] (1998) presented a hypothesis suggesting that molecular and morphological characteristics at the invasive front area of various squamous cell carcinomas that reflect tumor prognosis better than other parts of the tumor.

Methods for clinical staging of head and neck squamous cell carcinoma patients rely primarily on the assessment by CT, PET-CT or MRI in combination with a clinical examination by endoscopy and the use of ultrasound.[19,20] Head and neck carcinoma are usually treated, depending on the stage of disease, as well as based on various risk factors, by surgery, radiotherapy (RT), chemotherapy and combinations thereof.[21] While the location, as well as the extent of the primary tumor, is usually known with a sufficient degree of precision, most of the uncertainties about the evaluation of the exact tumor spread are related to the regional lymph node status.

In order to maximally utilize the tumor dose escalation as well as the normal tissue sparing potential of modern radiation technologies, it is important to be able to correctly delineate the target volume based on preclinical imaging data as well as on the statistical likelihood of microscopic tumor spread.[24] Disparities between pathological and clinical nodal staging data for head and neck carcinoma have been described in the literature by several authors.[22,23]

Staging systems for cancer, including the most universally used TNM classification system, have been based almost exclusively on anatomic information. However, the question arises whether staging systems should be based on this information alone as TNM system is based on tumor size. It failed to signify any information related to the actual histological condition of lesion. Other parameters have been identified that should be considered for inclusion in classification systems like the TNM. This is all the more important, as a shift toward nonsurgical treatments for head and neck cancer has been made over the years. For these treatment modalities tumor/biologic characteristics next to anatomic information may be particularly important for treatment choice and outcome.[25]

Antonio de L et al[26] in their study found significant correlation between TNM clinical staging with histopathological parameters (nuclear pleomorphism, degree of keratinization, lymphocytic infiltration). They concluded their study that the histologically invasive areas are primarily responsible for the clinical behaviour of the tumor, and this could be an important factor for the therapy of Head and Neck Cancer.

Our study mainly emphasized the requirement of correlations between TNM staging and malignancy microscopic grade scoring presented. Special attention can be given to treatment modalities and establishment of negative surgical margins based on the cyto morphology which can alter the prognosis in head and neck surgery

CONCLUSION

In this current study it was found HNC are more common in males and in the age group above 50 years. The common HNC cancer in our study was found to be tongue and hypopharynx whereas other studies show oral cavity squamous cell cancers are common. Most of our patients presented in their early stage of cancer. Though small biopsies aid in early diagnosis of head and neck cancer, there was no statistical correlation found in our study between TNM staging and microscopic grading. As histologically invasive carcinomas are responsible for clinical behaviors of tumor, the nodal status in clinical staging need to be confirmed by microscopic evaluation of node to assess infiltration by tumor as in many cases with advanced clinical staging, it is just due to reactive proliferation in response to tumor antigens.

The prognosis of patients with Lymph Node Metastasis has remained poor in spite of the extensive ongoing molecular studies and advances. Studies have been put forth to help in early diagnosis, predict the prognosis and thereafter modulate the treatment of cancer. Considering the scenario of our country's economy, TNM staging and grading has remained the corner stone for prediction of HNC behavior as advanced expensive techniques are not affordable to majority of the population.

Head and neck cancer are one of the challenges for surgeons. Both TNM staging along with microscopic grading of the tumor helps the surgeon to diagnose the disease in its early stage and prevent the progression of disease and decide the treatment modality. Most of the surgical procedure can be avoided in case of early diagnosis of HNC. From this study the information gathered may help in early diagnosis, and predict the prognosis of cancer based on staging and pathological grading which in turn implicate cancer treatment.

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