Original Research Article Journal of College of Medical Sciences-Nepal, Vol-10, No 4, Oct-Dec 014

ISSN: 2091-0657 (Print); 2091-0673 (Online)
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Correlation between T and N Stages of Head and Neck Squamous Cell Carcinoma

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DOI: http://dx.doi.org/10.3126/jcmsn.v10i4.12975

ABSTRACT

Background and Objective: Squamous cell carcinoma of the head and neck region is a common pathological entity. Advanced primary lesion (T) and neck node metastasis (N) both are bad prognostic features for the carcinoma. Purpose of this prospective cross sectional study is to see if T stage of primary Head and Neck squamous cell carcinoma correlates with N stage of Neck node metastasis. **Materials and Methods:** Patients of all ages and both sex with biopsy proven squamous cell carcinoma of Head and Neck region were included in the study. After detailed history taking and clinical examination to identify the clinical T and N status of the disease, biopsy was taken from the primary site under local or general anesthesia. Fine Needle Aspiration Cytology (FNAC) of the palpable neck node (s) was performed. Correlation of T stage of the primary tumor was seen with that of N stage of the neck by applying the statistical tests. **Results:** There was significant correlation of the T status of the primary head and neck carcinoma with N status of the secondary neck. **Conclusion**: The T status of primary head and neck squamous cell carcinoma correlates with the N status of Neck in general. By knowing the T status of the primary tumor, we can predict the nodal status in most of the cases of head and neck carcinomas which can be used in planning the treatment modalities also.

Key Words: Head and neck carcinoma, Neck node metastasis, Primary, Squamous cell

Citation: Koirala K, Sinha B, Baskota DK. Correlation between T and N stages of head and neck squamous cell carcinoma. JCMS Nepal 2014;10(4):26-31.

INTRODUCTION

Head and neck malignancies are the heterogeneous collection of malignancies arising in multiple anatomical sub-sites of head and neck, each with unique clinical, pathological and prognostic features. Broadly, head and neck sites can be divided into the nose, nasopharynx, Oral cavity, oropharynx, hypopharynx and larynx.[1] Head and neck cancers are the sixth most prevalent cancers in the world, with a global annual incidence of 500,000.[2] The vast majority of these cancers are squamous cell carcinomas that originate in the mucosal lining located throughout the head and neck region. Squamous cell carcinoma comprises of about 90% of total malignancies in this region.[2] They have a regional nodal distribution which is involved in the biological activity of the neoplasm. Their behavior is quite unpredictable, but grossly depends on their site of origin. Each anatomical site has its own particular lymphatic spread pattern and prognosis. As these cancers enlarge, they tend to spread from their primary location to the nearby regional lymph nodes in a predictable sequence. The presentation of these malignancies is variable and organ specific. In majority of the cases they present as nodal syndrome, neurological syndrome and obstructive syndrome. Their tissue diagnoses have to be confirmed either histopathologically or cytopathologically.

Presence of cervical lymph node metastasis is one of the most important prognostic factors in the management of head and neck squamous cell carcinoma. Once the tumor involves the neck nodes, survival drops by 50%.[3] The risk of nodal metastases is dependent on various factors related to the primary tumor. These include the site, size (large or small), T stage, location of the primary tumor (within an organ such as the vocal cord compared with supraglottis) and histomorphology of the primary tumor. Tumors with a greater thickness and size are more likely to have high chances of locoregional as well as systemic metastases.[4]

The present study was conducted to see if the stage of primary head and neck squamous cell carcinoma (T) correlates with the neck node metastasis (N) by assessing the extent of primary tumor (T stages) in the carcinoma and the stages of the metastatic lymph node (N) in neck positive cases and by comparing them.

MATERIALS AND METHODS

This is a prospective cross sectional study carried out in the Department of Otolaryngology and Head and Neck Surgery (ENT-HNS), Tribhuwan University Teaching Hospital (TUTH), Kathmandu, Nepal from 15th of September 2004 to15th of July 2006. The patients presenting to the Outpatient Department of Otolaryngology and Head and Neck Surgery with symptoms suggestive of head and neck malignancies pertaining to different sites of head and neck were assessed by the author. Complete history taking and clinical examination including flexible nasopharyngolaryngoscopy were performed regarding the size and extent of primary tumor and for the presence of palpable secondary neck node if any. The size of accessible primary tumor and all the secondary nodes were assessed as accurately as possible. Biopsy was taken from the primary site under local or general anesthesia. Fine Needle Aspiration Cytology (FNAC) was performed in all the patients presenting with palpable neck swelling. Patients were followed up with biopsy and FNAC reports. Biopsy was taken as the gold standard investigation for tissue diagnosis and patients with biopsy proven squamous cell carcinoma were finally included in the study. X-ray chest and liver function tests were carried out as ancillary tests to rule out distant spread of the malignant tumor. Ultrasonography of the neck and abdomen was done in few cases. Staging of tumor was done according to UICC / AJCC, TNM stage criteria.[5,6]

RESULTS

A total of 106 histopathologically confirmed new patients of Head and Neck squamous cell carcinoma with or without palpable neck node metastasis at the time of presentation were included in our study. Age of the patients ranged from 17 years to 89 years with the mean age 59.2 yrs. Maximum number of patients belonged to the age range of 61-70 years (39.62%), followed by 51-60 years (27.35%), as shown in table 1.

Table 1: Distribution of patients according to age groups

Age Range (Years)	No. of Patients
10-20 years	1
21-30 years	2
31-40 years	5
41-50 years	11
51-60 years	29
61-70 years	42
71-80 years	14
81-90 years	2
Total	106

Males accounted for 81.13% (n=86) of total patients, while females were18.87 % (n=20). Male to Female ratio was 4.3:1. There was positive history of smoking in 96 out of 106 patients (90.5%) Fifty three patients were both smokers as well as alcohol consumers (50 %).Larynx was the most commonly involved site, followed by hypopharynx, oral cavity and others. Distribution of patients according to different sites, their gender wise presentation and T status is shown in table 2.

Table 2: Distribution of patients according to T stage in different primary sites

	T1	T2	T3	T4	Total	Males	Females
Larynx	5	4	33	7	49	42	7
Hypopharynx	1	3	15	4	23	23	0
Oral cavity	2	5	7	2	16	8	8
Oropharynx	2	6	2	2	12	8	4
Nasopharynx	1	1	0	1	3	3	0
PNS/ Maxilla	0	2	0	1	3	2	1
Total	11	21	57	17	106	86	20

Table 3: Distribution of patients according to N stage of disease

Sites	N0	N+				Total
		N1	N2	N3	Total N+	
Oral Cavity	8	6	1	1	8	16
Oropharynx	7	3	2	0	5	12
Hypopharynx	6	2	13	2	17	23
Larynx	32	7	9	1	17	49
Nasopharynx	0	1	1	1	3	3
PNS	3	0	0	0	0	3
Total	56	19	26	5	50	106

More than half of the patients (56/106 i.e. 52.8%) presented without palpable neck node and 50 patients (47.2%) had palpable neck nodes. Neck node metastasis was highest in hypopharynx (73.9%) followed by oral cavity (50%) and oropharynx (41.6%).

Distribution of patients according to N stage is shown in table 3. Table 4 shows the overall T and N status of the patients. Cumulative data for T1-T2, T3-T4 and N0 and N+ were analysed which was statistically significant with the p value of 0.036 (Table 5).

Table 4: Overall T and N status

Primary (T)	Nodal Status (N)				Total
	N0	N1	N2	N3	
T1	7	2	1	1	11
T2	15	2	3	1	21
T3	27	12	16	2	57
T4	7	3	6	1	17
Total	56	19	26	5	106

Table 5: Cumulative T-T2 and T3-T4 vs N0 and N+ values (chi2=4.41, p=0.036, association significant)

T status	N Status		
	N0	N+	Total
T1-T2	22	10	32
T3-T4	34	40	74
Total	56	50	106

DISCUSSION

The main objective of this study is to prove if there is increased chance of neck node metastasis (N) with increasing size/stage of the primary head and neck carcinoma (T). Although in general the size of primary head and neck carcinoma seems to have a positive correlation with the metastatic neck node, this only is not the sole result found in the literature as the cancers have their own nature of metastasis. The Tumor and Nodal stage have got a direct impact on the treatment modality, surgical outcome, and prognosis in cases of squamous cell carcinoma of head and neck region. Most of the primary tumors of head and neck regions are inaccessible to direct examination and not all the involved lymph nodes are palpable. In most of the instances the primary site is seen with the help of endoscope only. Clinical evaluation of the lymph nodes is not that reliable in metastatic neck disease. In one study, the sensitivity of clinical palpation was 54.75% in detection of metastatic neck nodes.[7] Staging of the cervical lymph node by palpation alone is a major challenge. Clinical examination is influenced by the skill of the examiner, the patient's body habitus and

whether the patient had previous surgical or irradiation therapy. As a result of these factors, the false negative rate in clinical assessment ranges from 20% -51%.[8]

Other methods of assessing inaccessible primary sites and neck nodes like computerized tomography scan were carried out in some, but not in all the patients due to cost factor. Histopathology of the primary tumor and Fine Needle Aspiration Cytology from the secondary neck node was taken as the gold standard for histopathological and cytological diagnosis and differentiation of the disease. X-ray chest posteroanterior view and liver function tests were done to rule out distant metastasis of disease in the lungs and liver.

The sampling method used in this study was the non probability convenient sampling method whereby the first patient fulfilling the criteria was included in the study. The needed sample size was 72 but we could include 106 patients in our study. As this study does not include the treatment received by the patients, nor any intervention was done, the sampling technique does not seem to have any effect with the outcome of this study.

Patients of all the ages were included in our study. The age ranged from seventeen to eighty nine years. The youngest patient was of 17 years and was a case of nasopharyngeal carcinoma. The eldest patient was of 89 years and was a case of oropharyngeal carcinoma. The mean age of presentation was 59.2 years. This correlates with other studies which have reported the mean age ranging from 59.3 yrs to 60.3 yrs.[9,10]

The most common age range was at the seventh decade in our study but Ahluwalia, Bhattacharjee and Baskota have reported the most common age range as the sixth decade.[11-13]Those studies were not exclusively done for squamous cell carcinoma. Eighty two percent of our patients were above the age of 50 years which also suggests head and neck squamous cell carcinoma to be the diseases of the elderly population.

In our study, male patients were more than females. Male to female ratio was 4.33:1 which is in accordance with other studies with reports of 4:1 to 5:1.[10,14,15]

Ninety percent of patients in our study used to smoke. Sixty four percent patients used to consume alcohol and fifty percent of patients were both smokers and alcohol consumers. This supports the well known and well studied risk factors- smoking and alcohol to be responsible for most of the cases of squamous cell carcinoma of head and neck region. This also might explain the increased incidence of supraglottic laryngeal cancer observed in this study. The patients who smoke and consume alcohol are at 10 times increased risk of developing the head and neck carcinoma.

Fifty six percent of our patients suffering from cancer of oral cavity (9/16) used to chew pan and tobacco. About 90% of people with oral cavity and oropharyngeal cancer use tobacco, and the risk of developing these cancers increases with the amount smoked or chewed and duration of the habit.[9]

Site wise analysis of the primary tumor was also done. Larynx was the most commonly involved site (46.2%), followed by hypopharynx (21.7%), oral cavity (15.3%), and oropharynx (11.3%). Nasopharynx and paranasal sinuses were the minority. Similar incidences have been reported in Korean and Indian populations where the incidence of laryngeal carcinoma was 45.9% and 60% of all the carcinomas of Head and Neck region respectively.[14,15] However oral cavity and oropharyngeal carcinomas were the most common head and neck squamous cell carcinomas reported by Ahluwalia et al and Bhattacharjee et al in North East India.[11,12]

Distribution was also analyzed according to the T-Stage of the primary tumor. The most common T stage was T3 (53.8%) followed by T2 (20%), T4 and T1 respectively. T3 was the majority in larynx,

hypopharynx and oral cavity. However T2 stage was commonest in oropharyngeal carcinoma. Similar reports have been shown by Akmansu et al in which the distribution of T status was T3 as commonest (37%) followed by T2 (34.8%), T4 (17.3%) and T1 (10.9%) respectively.[16] Pinnilla et al also reported T3 as the commonest stage (36%).[17]

Distribution according to the N Stage was also analyzed. More than half of the patients presented without palpable lymph node in the neck (52%). Most common neck positive stage was N2 followed by N1 and N3. The order of palpable neck nodes were hypopharyngeal carcinoma (73.9%), oral cavity carcinoma (50%), oropharynx (41.6%) and larynx (34%).

Correlation of T- Stage of Primary with N – Stage of Neck was analyzed overall. Patients with N_0 (No node) stage irrespective of the stage of primary tumor were 56 in numbers and those with Neck positive status were 50 in numbers. As there were less numbers of characters in each subgroup, data were merged regarding T1-T2, T3-T4 and N0 and N+. The distribution was significant as per the statistical analysis with Chi ^{2} = 4.412 and p value of 0.036. The overall correlation coefficient was 0.446.Correlation coefficient between N0 and N+ was 0.884.One tailed p value was 0.05. This shows that the overall T- status correlates well with the overall N- status in head and neck squamous cell carcinoma.

Our study is also supported by the studies carried out by Ross et al.[18] In a prospective study of 61 patients carried out in the United Kingdom, they found a significant correlation between T and N stages ($p<0.05$). However our study is not free from the weaknesses. Short duration of time, convenient non probability sampling technique method, and small sample size for the subgroup analysis are few examples. The study could have been more informative and reliable if a larger sample size was taken. Multicentric studies in different parts of the country can be carried out to look for better results. In the future, similar studies with larger sample size are recommended.

CONCLUSION

In general, the size of the primary tumor correlated with the metastatic nodal level. Association was significant overall. We hope that this information can be used while making the treatment plans for the patient's best care.

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