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Correlation of tumour size, cervical node metastasis and histological differentiation in patients with head and neck cancers, a hospital-based study

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Abstract
Head and neck cancers usually arise in the squamous cells that line the moist mucosal surfaces of the head and neck. They can present in the salivary glands, palate, below the tongue and other areas of mouth. They are further classified by the area from which they originate. These represent approximately 3% of all cancers. Early diagnosis is important to save the patient's life. This study was done to correlate the cancers with the tumour size, histology and site of origin. A total of 60 patients were selected for the study. All the patients' demographic and clinical data were recorded. It was observed that a majority of patients had tumour size of 2.1-4cms. Buccal mucosa, Alveolus, Hard Palate, ant. 2/3 of tongue, floor of mouth, Maxillary antrum had more cancers as compared to other areas. 28 patients had well defined cancer with correlation to cervical mode metastasis. These correlations are useful in the diagnosis of type of cancer with area. It was concluded that knowledge of the site and size of the tumour with histological grading helps formulate a treatment plan for the patient.

Keywords: Cervical node, metastasis, mucosa, neck, primary site, squamous cell carcinoma

Introduction

Head and neck (H&N) cancers contribute 5-10% of all cancers and they have a diverse biological and treatment response [1, 2]. It was observed that H&N cancers are the 8th most common cancers worldwide. Around 650,000 new cases are reported every year. The tumours need not be fatal to the patient if identified and treated at an early stage [3]. The mortality rate increases if the diagnosis and treatment are delayed. H&N cancers mainly develop in the oral cavity [4]. They can arise from soft tissue, salivary glands, skin, craniofacial bones and mucosal membranes. Most of the H&N cancers are of the squamous cell type [5]. Various studies have shown that all tumours do not demonstrate similar histological change but this rather depends on the site and function of the cell of origin. The etiological factors in the development of H&N cancers are smoking, tobacco chewing, carcinogenic exposure, diet, oral hygiene, infection, and history of oral drug intake [6, 7]. In recent years significant change has occurred in the diagnosis of cancer. Histology, HPV testing, TNM staging system, CT, MRI and PET scans are tools available for the diagnosis of H&N cancers [8, 9]. Each diagnostic method has limitations. In routine practice, a minimum of two methods are implemented to determine the type of cancer, as treatment is dependent on the tumour type. Histology plays major role in the identification of type of head and neck cancer. It gives clear idea about the type and stage of cancer [10]. In the present study we correlated the tumour size, cervical node metastasis and histological differentiation in patients with head and neck cancers.

Materials and methods

This study was conducted in the Department of General Surgery, SUT Academy of Medical Sciences, Vattapara, Trivandrum Kerala. The study duration was 2 years (2015-2017). A total of 72 patients were admitted in the Surgical Unit. Out of those, 60 patients were included in the study. The selection was done based on the biopsy report. The patients' demographic and clinical data were noted and analysed.

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Results

All patients who had tumours larger than 4 cms in diameter, with primaries situated in the buccal mucosa. Alveolus, anterior two thirds of the tongue and the maxillary antrum had clinically palpable nodes on admission. Conversely, majority of patients who had tumours smaller than 2 cms with primaries in the same sites had clinically negative neck nodes on admission (Table-1). The degree of differentiation of the primary varied according to tumour site. Majority of the anteriorly situated tumours, i.e. those arising in the oral cavity, were well or moderately differentiated (55.55 and 26.66 percent respectively) whereas the bulk of those situated posteriorly i.e. in the oropharnryx, were moderately or poorly differentiated (26.66 and 53.33 percent respectively) (Table-2). The degree of differentiation in turn, was found to influence the incidence of regional nodal metastasis. Overall, tumour differentiation showed an inverse relationship with the incidence of nodal metastasis. Decreasing tumour differentiation was associated with increasing nodal spread (64.29%, 75.00% and 87.5% in cases of well, moderately and poorly differentiated tumours respectively). Conversely, the number of patients who had clinically negative neck nodes on admission showed a decline with increasing tumour grade 35.7%, 25.0% and 12.5% with well, moderately, and poorly differentiated tumour respectively. When both tumour differentiation and its site were considered together in relation to the incidence of node metastasis. It was observed that majority of the anteriorly situated tumours were histologically well differentiated, and 33.0 to 83.0% of these tumours produced regional metastasis. This was in contrast to the posteriorly situated tumours, majority of which were histologically moderate to poorly differentiate and gave rise to a high regional metastatic rate of 66.0-100.0% (Table-3).

Table 1: Correlation between tumour size and cervical node metastasis

Tumour Size (cms)	No. of Patients	Total No. (%)		Total (%)		N + N$_1$ (%)		N$_2$ (%)		N$_3$ (%)	
		n	%	n	%	n	%	n	%	n	%
0-2	18	10	55.55	10	55.55	6	33.35	4	22.22		0
2.1-4	32	6	18.75	2	75.00	16	50	6	18.75	2	6.00
4+	10		-	10	100	2	20	7	70.00	1	10.00

Table 2: Tumour site and its histologic differentiation

Site	Total Number	Degree of differentiation		
		Well (%)	Moderate (%)	Poor (%)
Anteriorly situated Cancers		25	12	8
(Buccal mucosa. Alveolus, Hard Palate. Tongue ant. 2/3, Floor of mourn. Maxillary antrum)	45	(55.55)	(26.66)	(17.77)
Posteriorly situated Cancers		3	4	8
(Soft palate. Tonsil, Tongue post 1/3rd Floor of mouth)	15	(20)	(26.66)	(53.33)

Table 3: Correlation between tumour differentiation and cervical mode metastasis

Degree of HP different action	No. of Patients	Total No (%)	Total N+ (%)	N1 (%)	N2 (%)	N3 (%)
Well	28	10 (35)	18 (64.29)	16 (57.15)	2 (7.14)	-
Moderate	16	4 (25)	12 (75)	4 (25)	6 (37.5)	2 (12.5)
Severe	16	2 (12.5)	14 (87.5)	4 (25)	9 (56.25)	1 (6.25)

Discussion

Correlating the size of the primary lesion with the incidence of nodes subsequently occurring in the neck. This has been used to predict which patients will subsequently develop regional nodal metastasis. Spiro and Strong have shown that for cancer of the anterior two thirds of the tongue the likelihood of occult nodal disease varies from 29 percent of T1, lesions (Diameter less than 2 cms) to 43 percent of T2 lesions (Diameter between 2 and 4 cms) to 77 percent of T₃ lesions (Diameter more than 4 cms) [11]. Lindberg reported an increased incidence of cervical node metastatis with increase in the size of the primary in lesions of the tongue, floor of mouth, retromolar trigone, soft palate and oropharyngeal wall. Tumour thickness may be useful for predicting nodal disease [12]. Spiro study undertook a retrospective study of selected patients with no oral cancers for whom an optical micrometer was used to measure the thickness in millimeters of excised tumours in routinely prepared paraffin sections. In their series of 105 patients, the result of tumour thickness analysis indicated that tumour thickness rather than tumour stage had the best correlation with treatment and survival [13]. Disease related depth appeared unusual when the tumour were <2 mm regardless of tumour stage. The authors concluded that measurement of tumour thickness could be a better way to select patients who were most likely to benefit from elective treatment of the neck. Histologically a squamous cell carcinoma consists of an admixture of normal squamous cells and atypical anaplastic squamous cells. The more malignant the tumour, greater is the number of atypical cells. The typicality expresses itself in terms of variations in the size and the shape of cells, hyperplasia and hyperchromatasia of the nuclei, absence of intercellular bridges, atypical mitotic figures and keratinisation of cells. Differentiation in a squamous cell carcinoma takes place in the direction of keratinisation, which represents the essential features in the system of histological grading introduced by Broder. The grading system recognizes grades of severity according to the proportions of differentiated cells present in the tumour, In Grade I more than 75% of the cells are differentiated; in Grade II more than 50%, in Grade III more than 25% and in Grade IV less than 25%. Alternatively, squamous cell carcinomas can be graded into (1) Well differentiated tumours with minimal pleomorphism, few mitoses, large number of horn pearl and abundant keratinization (2) Moderately differentiated-tumours where atypical cells are conspicuous, few horn pearls are present, and keratinisation is much less evident (3) poorly differentiated-tumours with much cellular and nuclear pleomorphism negligible keratinisation and absence of horn pearls. The relevance of histologic grade of tumour to prognosis is well established in breast cancer and

bladder cancer. Arthur and Farr studied the prognostic significance of histologic grade in squamous cell carcinomas of oral cavity and oropharynx and demonstrated a clear relationship between the histologic grade and metastatic nodal involvement with increasing histologic grade of the primary and suggested that histologic assessment should play a part in designing the therapeutic approach [14]. Histological approach plays major role in the diagnosis of H&N cancers.

Conclusion

The above observations seem to suggest that large primaries (more than 4 cm) and those with higher histologic grade (moderate to poorly differentiated) specially when situated in the oropharynx or oral tongue, have a greater propensity for developing regional nodal metastasis compared to the rest. This data could help define the group of patients who are likely to harbour occult disease in their neck in the absence clinically detectable nodes, and for whom elective treatment of the neck at the time of treatment of the primary may prove to be beneficial.

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