Prevalence of Cervical Lymph Node Metastasis of Maxillary Squamous Cell Carcinoma: Correlation between Clinical and Imaging Studies

Md Mostafijur Rahman*

Lecturer, Department of Maxillofacial Surgery, Dhaka Dental College, Dhaka, Bangladesh

*Corresponding Author: Md Mostafijur Rahman, Lecturer, Department of Maxillofacial Surgery, Dhaka Dental College, Dhaka, Bangladesh.

Abstract

Background: Cancer of the oral cavity is one of the most devastating disease to afflict the head and neck causing significant disfigurement of the patient with severe morbidity and mortality. Oral cancer is a particularly challenging disease whose nature and management relates with the function and cosmesis of patients. Despite all of the improvements in diagnostic and management methods the prognosis of oral cancer remains unpredictable. Squamous cell carcinoma is the most common type of tumor among cancers in the oral cavity. In India cancer of the oral cavity is one of the five leading sites of cancer in either sex. On the basis of the cancer registry data, it can be estimated that annually 75000 - 80000 new oral cancer cases develop in India and only 15% of patients are diagnosed when the disease is at a localized stage. Tongue and floor of the mouth cancers form the bulk of cancers in the west. Oral cancer is responsible for 20% of all malignancies in Bangladesh. Incidence of oral cancer in Bangladesh is 20 - 25% in male and 16 - 17% in female. Several studies have been done on the metastasis of squamous cell carcinoma of the tongue/mouth floor and, in particular, on prophylactic neck dissection for tongue cancer. Only a few investigations have been done into the metastasis of squamous cell carcinoma of the upper jaw. But it is striking that the incidence of cervical lymph node metastasis from cancer of the maxilla is significant. Controversis about treatment of squamous cell carcinoma of the maxilla have not been Settled. The main obstacle is to compare the results is a lack of information of the stage of the patients. During the last two decades, several TNM staging systems for maxillary tumors have been proposed and yet come to agreement. We have found that computed tomography (CT) and Ultrasonography (USG) was very accurate in staging of the primary tumors. While clinical staging using conventional radiological methods is less satisfactory, CT and USG staging is as good as surgical staging. Therefore, it may be appropriate to herein report that making a good surgical plan correlation of clinical and imaging study in assessing nodal status may give unavoidable clues.

Objectives: To evaluate cervical lymph node metastasis in maxillary squamous cell carcinoma.

Study Design: Hospital based cross sectional study.

Study Setting and Period: Department of Oral and Maxillofacial Surgery, Dhaka Dental College and Hospital from January 2010 to June 2011.

Participants: Patient attending in the place of study with diagnosed case of oral squamous cell carcinoma of maxilla was selected for the study on fulfilling the inclusion criteria.

Keywords: Cervical Lymph Node; Squamous Cell Carcinoma; Computed Tomography (CT); Ultrasonography (USG)

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Introduction

Squamous Cell Carcinoma (SCC) of the oral cavity has unique clinical behavior relative to that in other head and neck sites [1]. Squamous cell carcinomas of the hard palate, maxillary gingival and maxillary alveolus occur at relatively low rates compared with squamous cell carcinomas in other oral sites. The therapeutic options for maxillary SCC stem from the experience over the last two decades has shown significant regional and site specific differences with regard to clinical behavior [2]. Based on oral squamous cell carcinoma high rate of metastasis to cervical lymphatics, neck dissection and or radiotherapy are commonly performed [3]. The question of whether or not to treat the neck for maxillary SCC is complicated by the inability to determine which patients are at high risk for occult regional disease (Kennedy BJ, Murphy GP., *et al*. 1992). There is little within the surgical literature to guide treatment for maxillary squamous cell carcinoma. So adequate evaluation of behavior of maxillary carcinoma with respect to regional cervical metastasis is now the demand.

Squamous cell carcinoma of the hard palate and upper gum has a relatively indolent behavior with a low risk of regional lymph node metastases (Jatin P Shah, Ziv Gil., *et al*. 2009). On the other hand, cancers of the oral tongue, floor of the mouth and lower gum have a high risk of regional lymph node metastases with an adverse impact on prognosis. The patterns of regional lymph node metastasis from primary cancers of the oral cavity are well established and sequential progression of metastatic spread occurs from primary oral cancers. The first echelon lymph nodes for oral cancer are located at levels 1, 2, and 3 in the neck with a relatively infrequent dissemination to level 4. Skip metastasis to level 5 does not occur. A "clinically positive" lymph node is usually greater than 1 cm, spherical rather than a flat ovoid, and harder than the non-metastatic lymph node (Robert Lindberg. MD 1972). Though primary tumors located in the anterior part of the oral cavity have a lesser risk of dissemination to regional lymph nodes compared to similar staged lesions in the posterior part of the oral cavity or oropharynx (Jatin P Shah, Ziv Gil., *et al*. 2009). But in this study lymph node metastasis was detected in 64.3% cases at the first examination. This variation may be due to advanced staged disease of our studied population [4-12].

Method

We recorded all patients of oral squamous cell carcinoma attended between January 2010 to June 2011 at department of Oral and Maxillofacial Surgery in Dhaka Dental College Hospital according to inclusion and exclusion criteria. All the patient had gone thorough clinical evaluation and TNM classification was done. Ultrasonogram of neck and high resolution CT Scan of all patients were done to evaluate the status of the neck lymph nodes. Maxillary SCC was divided into six compartment named i) anterior palatal ii) Anterior buccal iii) Midpalatal iv) Mid buccal v) Posterior palatal vi) posterior buccal. The involved primary site was detected according to this classification and was noted.

Socio-demographic data were collected in a preformed questionnaire. Data were analyzed by calculating the means and standard deviations and comparison were made by Chi Square test. A 'p' value < 0.05 was considered significant.

Results and Discussion

A prospective study with 42 cases of oral squamous cell carcinoma of maxilla was taken. In this study age range was 40 - 65 years with the mean age of 52.5 years. This study showed highest percentage (31%) of the subject was from the age group 46 to 50 and 51 to 55 years and the lowest (2.4%) from the age group 61 to 65 years. Among the study subject male was 64.3% and female was 35.7%. In this study 40 - 45 years age group suffers mostly in anterio-buccal (66.7%) tumor, 46 - 50 years group suffers posterio-palatal (23.1%), 51 - 55 years group suffers posterio-palatal (46.2%), 56 - 60 years group suffers posterio-palatal (41.7%) tumor. In this study at the first examination lymph node metastasis was detected in 64.3% of the patient. Anterio-palatal group (n = 03) involves mostly in level-II (upper jugular), 66.7%. Mid-palatal group (n = 01) 100% in level-I (submandibular), Posterio-palatal group (n = 14) mostly in level-I (submandibular), Anterio-buccal group (n = 06) involves lymphnode in less (16.7%) percentage. Mid-buccal group (n = 03) involves mostly level-I (submandibular), posterio-buccal (n = 15) group lymph node involvement was mostly (73.3%) in level-II. It showed the smaller the T, chances of nodal metastasis is less and higher the T (T > 4 cm), nodal metastasis is higher (84.2%). This value is statistically significant. This study

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showed most of (35.7%) the cases of maxillary squamous cell carcinoma had no lymph node involvement (N0), then comes N2a (26.2%) and N1 (19%). The imaging study showed 50% of the total patient had positive lymph node and 50% patient had negative lymph node. But clinically 64.3% of the study population had positive lymph node and 35.7% had clinically negative lymph node. The sensitivity of the imaging studies is 64.2% and specificity is 85.7%.
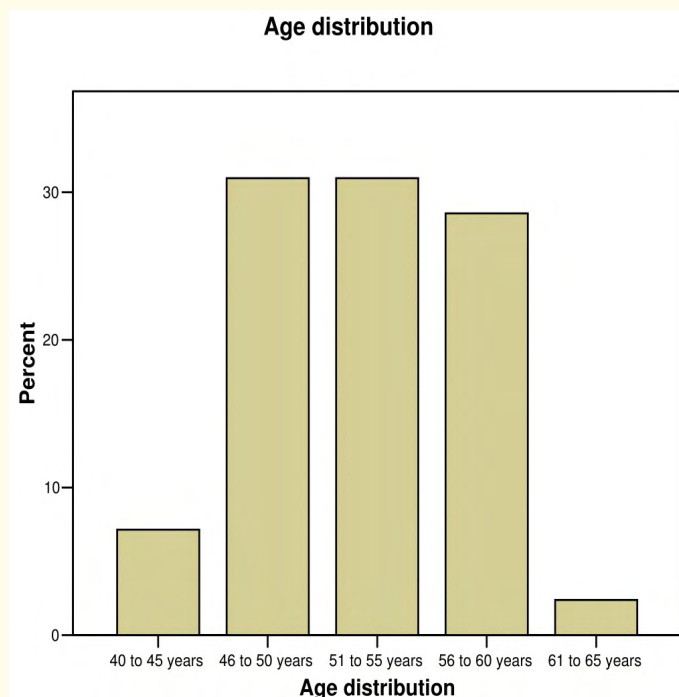
Figure 1: Shows highest percentage (31%) of the subject was from the age group 46 to 50 and 51 to 55 years. and the lowest from the age group 61 to 65 years.
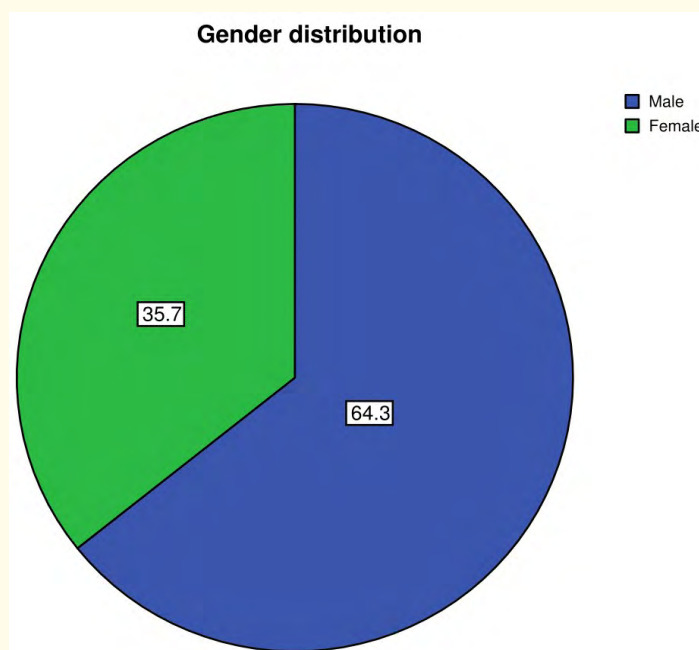
Figure 2: Shows gender distribution of the subject. Among the study subject male was 64.3% and female was 35.7%.

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Figure 3: Shows bar diagram of the site of the tumors. Posterior buccal is more frequently involved among all other sites.

Figure 4: Showing larger size of the tumor involves more frequently.

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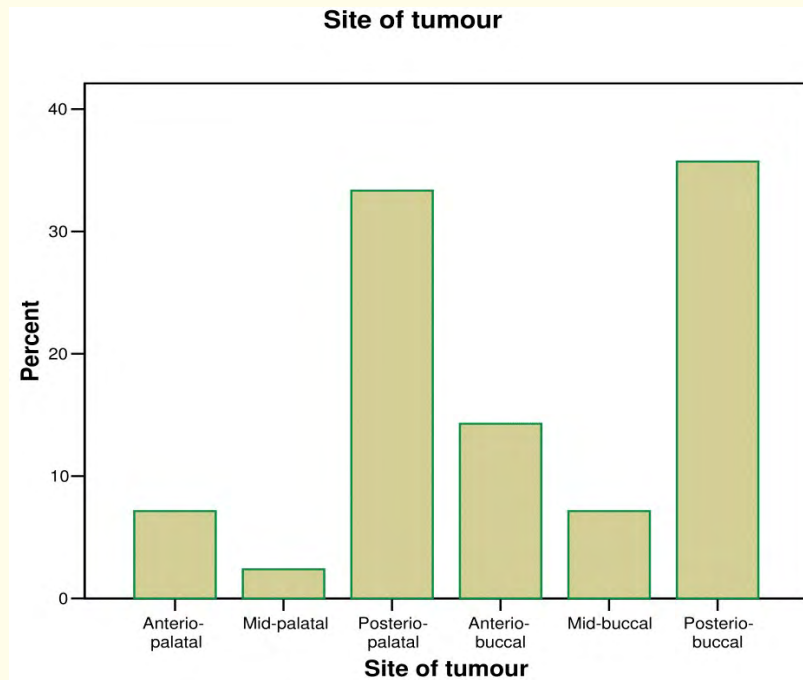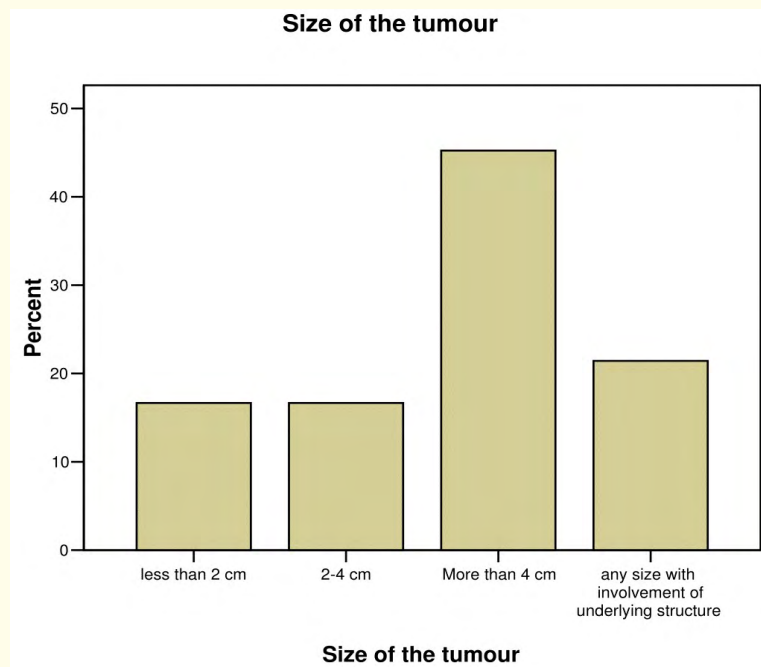
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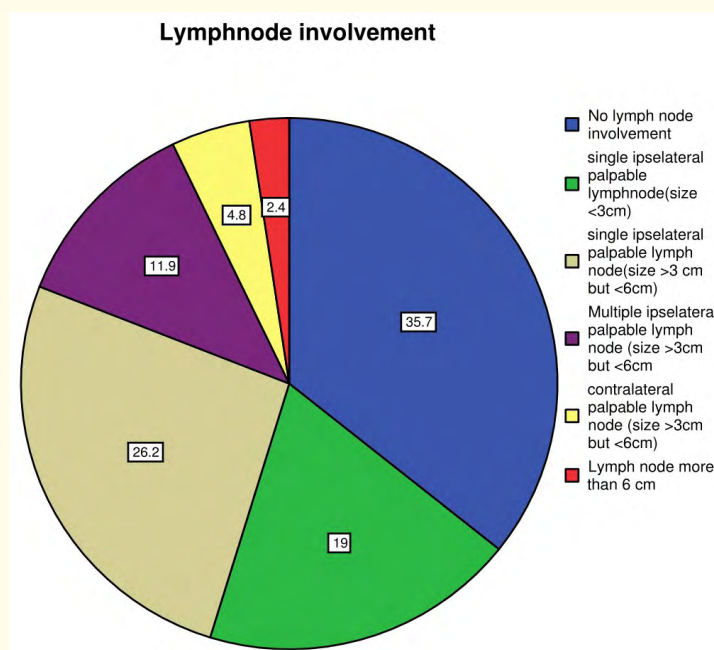
Lymphnode involvement

Figure 5: Shows most of the cases of maxillary squamous cell carcinoma had no lymph node involvement, No (35.7%), then comes N2a (26.2%) and N1 (19%).

			Level I			Level of lymph node				Total
				Level II	Level III	Level IV	Level 0	Level II and III	Level I and II	
Site of tumour	Anterio-palatal (03)	Count	0	2	0	0	1	0	0	3
		% within Site of tumour	.0%	66.7%	.0%	.0%	33.3%	.0%	.0%	100.0%
	Mid-palatal (01)	Count	1	0	0	0	0	0	0	1
		% within Site of tumour	100.0%	.0%	.0%	.0%	.0%	.0%	.0%	100.0%
	Posterio-palatal (14)	Count	5	3	3	1	2	0	0	14
		% within Site of tumour	35.7%	21.4%	21.4%	7.1%	14.3%	.0%	.0%	100.0%
	Anterio-buccal (06)	Count	1	0	0	0	5	0	0	6
		% within Site of tumour	16.7%	.0%	.0%	.0%	83.3%	.0%	.0%	100.0%
	Mid-buccal (03)	Count	2	0	0	0	1	0	0	3
		% within Site of tumour	66.7%	.0%	.0%	.0%	33.3%	.0%	.0%	100.0%
	Posterio-buccal (15)	Count	2	3	1	1	4	2	2	15
		% within Site of tumour	13.3%	20.0%	6.7%	6.7%	26.7%	13.3%	13.3%	100.0%
Total		Count	11	8	4	2	13	2	2	42
% within Site of tumour			26.2%	19.0%	9.5%	4.8%	31.0%	4.8%	4.8%	100.0%

Table 1: Shows the relation of site of tumor and level of lymph node. Anterio-palatal group involves mostly in level-II (66.7%). Mid-palatal group (100%) in level-I, Posterio-palatal group mostly in level-I, Anterio-buccal group involves lymph node in less (16.7%) percentage. Mid-buccal group involves mostly level-I, posterio-buccal group lymph node involvement was mostly (20%) in level-II.

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Size of the tumour			No lymph node involvement	single ipselateral palpable lymph node(size < 3 cm)	single ipselateral palpable lymph node (size >3 cm but <6cm)	Multiple ipselateral palpable lymph node (size > 3 cm but < 6 cm	Contralateral palpable lymph node (size > 3 cm but < 6 cm)	Lymph node more than 6 cm		Total
Size of the tumour	Less than 2 cm	Count	7	0	0	0	0	0	0	7
		% within Size of the tumour	100.0%	.0%	.0%	.0%	.0%	.0%		100.0%
	2 - 4 cm	Count	4	3	0	0	0	0	0	7
		% within Size of the tumour	57.1%	42.9%	.0%	.0%	.0%	.0%		100.0%
	More than 4 cm	Count	3	4	9	2	1	0		19
		% within Size of the tumour	15.8%	21.1%	47.4%	10.5%	5.3%	.0%		100.0%
	Any size with involvement of underlying structure	Count	1	1	2	3	1	1		9
		% within Size of the tumour	11.1%	11.1%	22.2%	33.3%	11.1%	11.1%		100.0%
Total		Count	15	8	11	5	2	1		42
% within Size of the tumour			35.7%	19.0%	26.2%	11.9%	4.8%	2.4%	100.0%	

Table 2: Shows relation of size of tumor and lymph node involvement.

Age distribution			Anterio-palatal	Mid-palatal	Posterio-palatal	Anterio-buccal	Mid-buccal	Posterio-buccal		Total
Age distribution	40 to 45 years	Count	0	0	0	2	0	1		3
		% within Age distribution	.0%	.0%	.0%	66.7%	.0%	33.3%		100.0%
	46 to 50 years	Count	1	1	3	2	2	4		13
		% within Age distribution	7.7%	7.7%	23.1%	15.4%	15.4%	30.8%		100.0%
	51 to 55 years	Count	2	0	6	1	1	3		13
		% within Age distribution	15.4%	.0%	46.2%	7.7%	7.7%	23.1%		100.0%
	56 to 60 years	Count	0	0	5	1	0	6		12
		% within Age distribution	.0%	.0%	41.7%	8.3%	.0%	50.0%		100.0%
	61 to 65 years	Count	0	0	0	0	0	1		1
		% within Age distribution	.0%	.0%	.0%	.0%	.0%	100.0%		100.0%
Total		Count	3	1	14	6	3	15		42
% within Age distribution			7.1%	2.4%	33.3%	14.3%	7.1%	35.7%	100.0%	

Table 3: Shows the relation of age distribution of the subject and site of tumor. In this study 40-45 years age group suffers mostly in anterio-buccal (66.7%) tumor, 46-50 years group suffers posterio-palatal (23.1%), 51-55 years group group suffers posterio-palatal (46.2%), 56-60 years group suffers posterio-palatal (41.7%) tumor.

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			Site of tumour						Total
			Anterio-palatal	**Mid-palatal**	**Posterio-palatal**	**Anterio-buccal**	**Mid-buccal**	**Posterio-buccal**	
Gender distribution	Male	Count	3	0	12	5	2	5	27
		% within Gender distribution	11.1%	.0%	44.4%	18.5%	7.4%	18.5%	100.0%
	Female	Count	0	1	2	1	1	10	15
		% within Gender distribution	.0%	6.7%	13.3%	6.7%	6.7%	66.7%	100.0%
Total		Count	3	1	14	6	3	15	42
% within Gender distribution			7.1%	2.4%	33.3%	14.3%	7.1%	35.7%	100.0%

Table 4: Shows the relation of gender and site of tumor. Male suffers mostly in posterio-palatal (44.4%) tumor and female suffers mostly in the same site (13.3%) only.

Conclusions

An apparent correlation was found between Clinical examination and Imaging studies to see the prevalence of neck metastases. Maxillary SCC spread to the cervical lymph node in bizarre pattern i.e. all the level of lymph node can be involved. Clinical examination as well as imaging findings must be correlated to diagnose the metastatic lymph node before taking the surgical plan. It can be concluded that neck-node metastases in maxillary SCC were frequently encountered.

Bibliography

1. Brennan CT., *et al*. "Surgical pathology of cancer of the oral cavity and oropharynx". *Laryngoscope* 101.11 (1991): 1175-1197.

2. Carvalho AL., *et al*. "Trends in incidence and prognosis for head and neck cancer in the United States: A site-specific analysis of the SEER database". *International Journal of Cancer* 114.5 (2005): 806-816.

3. Keski-Santti H., *et al*. "Elective neck treatment versus observation in patients with T1/T2 N0 squamous cell carcinoma of the oral tongue". *Oral Oncology* 42.1 (2006): 96-101.

4. Ahmad K., *et al*. "Squamous cell carcinoma of the maxillary sinus". *Archives of Otolaryngology* 107.1 (1981): 48-51.

5. American Joint Committee for Cancer Staging and End-Results Reporting: Manual for Staging of Cancer. Chicago: American Joint Committee (1978): 45-48.

6. Astrid LD Kruse and Klaus W Grätz. "Cervical metastases of squamous cell carcinoma of the maxilla: a retrospective study of 9 years". *Head and Neck Oncology* 1 (2009): 28.

7. Bristol IJ., *et al*. "Postoperative radiotherapy for maxillary sinus cancer: longterm outcomes and toxicities of treatment". *International Journal of Radiation Oncology • Biology • Physics* 68.3 (2007): 719-730.

8. Chiba I., *et al*. "Characteristics of P53 gene of oral squamous cell carcinomas associated with betel quid chewing in Sri Lanka". *International Journal of Cancer* 77.6 (1998): 839-842.

9. Cooper JS., *et al*. "Second malignancies in patients who have head and neck cancer: incidence, effect on survival and implications based on the RTOG experience". *International Journal of Radiation Oncology • Biology • Physics* 17.3 (1989): 449-451.

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10. Chowdhury Rahim Ullah. "Detection of Metastatic Cervical Lymph nodes Physical examination vs contrast computed tomography". Thesis (MS). Department of Oral and Maxillofacial Surgery, University of Dhaka (2007).

11. Greenberg JS, *et al*. "Disparity in pathologic and clinical lymph node staging in oral tongue carcinoma: Implications for therapeutic decision making". Cancer 98.3 (2003): 508-515.

12. Haddadin KJ., *et al*. "Improved survival for patients with clinically T1/T2, N0 tongue tumors undergoing prophylactic neck dissection". Head Neck 21.6 (1999): 517-525.