Indian Journal of Basic and Applied Medical Research; June 2020: Vol.-9, Issue- 3, P. 243 - 248
DOI: 10.36848/IJBAMR/2020/12225.51660

Original article:

Study of role of MRI in diagnosis and staging of oral cavity malignancies

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Abstract:

Introduction: In India, oral cancer represents a major health problem and most of the malignancies arising from the various sub sites of the oral cavity are squamous cell carcinomas In the developing world oral cavity is common site of carcinoma after lung, stomach and liver in males while in females it is the fifth commonest cancer after cervix, breast, stomach and lung. Oral cavity is a common site for many types of benign and malignant tumors.

Material and Methods: This was a cross sectional observational study of patients detected to have oral cavity malignancy. All patients with clinically suspected and incidentally detected oral cavity malignancy attending to the tertiary care center and medical college where the study was conducted. A total of 50 patients diagnosed with oral cavity malignancy .

Results: We found Correlation between nodal clinical staging and MRI staging. 10 Number of MRI Staging cases and 25 Number of Clinical Staging cases are at N0.. 23 Number of MRI Staging cases and 14 Number of Clinical Staging cases are at N1. 15 Number of MRI Staging cases and 10 Number of Clinical Staging cases are at N2. 2 Number of MRI Staging cases and 1 Number of Clinical Staging cases are at N3 . P value 0.0518

Conclusion: MRI is appropriate method to diagnose and to locate the oral cavity carcinomas along with its extent and staging. Carcinoma of tongue, buccal mucosa having staging T2N1 seems to be more common in the present study.

Introduction:

In India, oral cancer represents a major health problem and most of the malignancies arising from the various sub sites of the oral cavity are squamous cell carcinomas In the developing world oral cavity is common site of carcinoma after lung, stomach and liver in males while in females it is the fifth commonest cancer after cervix, breast, stomach and lung. Oral cavity is a common site for many types of benign and malignant tumors.[1] The benign tumors do not spread to other parts of the body whereas the malignant tumors can penetrate into surrounding tissues and spread to other parts of the body. Benign tumors of oral cavity include Eosinophilic granuloma, Fibroma, Granular cell tumor, Keratoacanthoma, Lipoma, Schwannoma, Neurofibroma, Papilloma, Verruciform xanthoma, Pyogenic granuloma etc, as well as Odontogenic tumors. The usual treatment for these conditions is to surgically remove them since they are unlikely to recur[1].

MRI is used to assess the extent of loco-regional tumor spread, depth of invasion and extent of lymphadenopathy. The invasion of the floor of the mouth by the tumor is depicted well in the coronal plane[2,3,4]. Non-contrast T1W sequences demonstrate cortical erosion and marrow invasion. Contrast-enhanced T1W images help assess marrow invasion[5], perineural spread, soft tissue extent, tumor thickness and best demonstrate necrosis in nodes[6]. The T2W images are sensitive to the presence of tumor tissue. The possibility of lymph node metastasis from oral squamous cell carcinomas can be predicted with help of certain factors like site, size, histological differentiation of the tumor etc.

With this perspective Present study of role of MR imaging in the evaluation of oral cavity malgnancy is undertaken.

Material and Methods:

This was a cross sectional observational study of patients detected to have oral cavity malignancy.All patients with clinically suspected and incidentally detected oral cavity malignancy attending to the tertiary care center and medical college where the study was conducted.A total of 50 patients diagnosed with oral cavity malignancy **.** The present study was conducted from period from November 2017 to October 2019.

Inclusion criteria

1. All patients with oral cavity malignancies who are subjected for surgery as the first treatment modality.
2. All patients with oral cavity malignancies in whom pretreatment MRI evaluation is performed according to protocol and whose histopathology reports post surgery are available.

Exclusion criteria

1. Patients who are unwilling have MRI evaluation.
2. Patients who have contraindications to magnetic resonance imaging.
3. Patients with oral cavity malignancies in whom non surgical treatment is the first line of treatment.

Study procedure

All eligible patients were properly counseled and gave informed consent before entry into the study. Detailed medical histories of each patient were taken and general, physical, systemic examination was done. Relevant investigations were done according to clinical findings.

MRI performed using a 1.5 T scanner (PHILIPS ACHEIVA) using a dedicated 16 channel head neck (HNS) coil for both conventional and DWMRI. The Range was from the base of skull to the clavicles with a slice thickness of 4mm. The matrix will be 276 x 184 and the Field of view will be 250 (Rectangular field of view RFOV = 80%).

This study was conducted after proper permission of ethical committee.

Results:

In the present study we observed 50 patients to evaluate the role of MRI in the oral cavity malignancies.

Male were 86% while female were 14% in the present study.

Majority of study subjects were with malignancy of tongue 26% followed by buccal mucosa 22% and lower alveolus & RMT (10%).

T2 staging was seen in 36% patients which was maximum among all study subjects diagnosed by MRI.

N1 staging in 46% which was maximum among all study subjects diagnosed by MRI.

Majority of study subjects detected with T2 & T3 staging was seen in 32% patients

Table No.1: Correlation between clinical tumor staging and MRI tumor staging.

Stage	MRI Staging Cases	Clinical Staging cases	P value
T0	00	10	0.0461
T1	14	16	
T2	18	16	
T3	9	06	
T4a	5	01	
T4b	4	01	
Total	50	50	0.0461

The correlation between clinical staging and MRI staging of tumor was found to be highly significant.(p value is 0.0461)

Table No.2 : Correlation between nodal clinical staging and MRI staging.

Stage	MRI Staging Cases	Clinical Staging cases	P value
N0	10	25	0.0518
N1	23	14	
N2	15	10	
N3	2	01	
Total	50	50	

The correlation between nodal staging detected clinically and by MRI was found to be highly significant.(p value is 0.0518)

Table No.3: Correlation between MRI and HP tumor staging.

Stage	MRI Staging Cases	HP	P value
T0	00	00	1.000
T1	14	12	
T2	18	14	
T3	9	14	
T4a	5	06	
T4b	4	04	
Total	50	50	

The correlation between MRI staging and HP staging of tumor was found to be not significant.(p value 1.000)

Table No.4: Correlation between nodal MRI staging and HP staging.

Stage	MRI Staging Cases	HP	P value
N0	10	23	1.000
N1	23	09	
N2	15	16	
N3	2	2	
Total	50	50	

The correlation between nodal staging detected by MRI and HP was found to be non significant.(p value is 1.000)

Discussion:

In India, oral cancer represents a major health problem and most of the malignancies arising from the various sub sites of the oral cavity are squamous cell carcinomas [7]. Oral cavity carcinomas include buccal mucosa, alveolus , gingival, hard palate and tongue and floor of the mouth cancers. It is more prevalent in male and older adults[5]. In our study , The highest number of patients was in the age group of 50 years and above (60%). The incidence was higher in males (86%).

For appropriate treatment planning of the oral cavity carcinomas an adequate assessment of tumor staging is essential. Multiple studies validate increased tumor size is associated with reduced overall survival, hence the size is important and it influence both the 5-year survival rates and rates of positive cervical lymphadenopathy. Evaluation of involvement of surrounding structures, apart from tumor size, is also important in these tumors to decide T stage. Owing to excellent soft tissue contrast and multi planer views, MRI better delineates tumor size and thickness, local extension into surrounding structures, perineural invasion and bone infiltration [8].

Tumor Node Metastasis (TNM) classification is currently the commonly used system for describing malignant tumors and their extent of spread (both regional and distant). This staging system is the guide for every radiologist for assessment of oral carcinomas as well as for reporting relevant studies.

Results of the study showed that the highest number of patients had tongue malignancy (about 26% of the patients). Early tumors of the tongue tend to be confined within the tongue.

In our study , we showed Correlation between clinical tumor staging and MRI tumor staging with P value 0.0461 which is significant. We found Correlation between nodal clinical staging and MRI staging with P value 0.0518 . This is consistent with the studies performed by Amandeep Singh et al. [7] with P value 0.01 and Valecha J et al [8] which also showed that accuracy of MRI in the overall stage grouping was high as compared to clinical staging.

In present study we used the RTT on contrast enhanced T1 weighted spin echo images. No cervical metastasis was found in patients with tumors that were less than 9 mm of RTT. The difference in cervical disease between the two groups of RTT (less than 9 mm vs. 9 mm and greater) was statistically significant (0.0001). Therefore, RTT of 9 mm and greater was found to be predictive of regional metastasis in the present study. A previous study of Hiroshi Iwai, MD, PhD; Ryoichi Kyomoto, MD, PhD; Sang Kil Ha-Kawa, MD, PhD; Shinryu Lee, MD; Toshio Yamashita, MD, PhD(10)shows No cervical metastasis was detected in patients with tumors of less than 6 mm of reconstructed thickness in the MRI examination. The difference in cervical metastasis between the two groups, namely, less than 6 or more than 6 mm, was statistically significant (P = .0051).

All findings in this research when compared with previous researches, we observed that most of the findings were similar. Few findings were showing differences which might be due to difference in sample size, geographical variation or racial variations.

Conclusion:

MRI is appropriate method to diagnose and to locate the oral cavity carcinomas along with its extent and staging. Carcinoma of tongue, buccal mucosa having staging T2N1 seems to be more common in the present study.

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Date of Submission: 24 February 2020 Date of Peer Review: 21 March 2020
Date of Acceptance: 19 May 2020 Date of Publishing: 02 June 2020
Author Declaration: Source of support: Nil, Conflict of interest: Nil
Ethics Committee Approval obtained for this study? YES
Was informed consent obtained from the subjects involved in the study? YES
For any images presented appropriate consent has been obtained from the subjects: NA
Plagiarism Checked: Urkund Software

DOI: 10.36848/IJBAMR/2020/12225.51660