Original Research Paper

Radiology

COMPARATIVE EVALUATION OF CLINICAL AND ORTHOPANTAMOGRAM (OPG) FINDINGS IN ORAL SQUAMOUS CELL CARCINOMA

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KEYWORDS :

Introduction

Worldwide, head and neck cancer is the sixth most common cancer for men and women, and the third most common in developing nations.(1) The disproportionately higher prevalence of oral cancer in India as one of the fifth leading cancer in either sex are related to the use of tobacco in various forms, consumption of alcohol and low socioeconomic condition related to poor hygiene, poor diet or infections of viral origin.(2)

Ninety percent of oral cavity cancers are oral squamous cell carcinoma (OSCC). Most are obvious on clinical examination, so the focus of imaging is on staging and surveillance. Imaging options include panoramic radiography, CT (computed tomography), MRI (magnetic resonance imaging), and positron emission tomography (PET). Using these tools, radiologists contribute information regarding the characteristics of the primary tumor (T stage, as defined by the American Joint Committee on Cancer Staging).

Although there is extensive work on imaging of OSCC in western literature but there are less evidences present in the Southeast Asian population. There are various challenges in the treatment of oral squamous cell carcinoma in this region, first being delayed diagnosis due to less awareness about the disease. Most of the cases at the time of diagnosis are advanced. As there is scarcity of advanced diagnostic setups in various parts of country, diagnosis of the disease is mostly focused on clinical examination. For the treatment planning of OSCC the extent of spread is very important to determine the treatment modality. Surgical treatment results in morbidity in patients due to sacrifice of involved part and inadequate removal may lead to recurrence of the disease. Orthopantamogram are widely available and it may add some value to diagnosis and treatment planning. Ortopantomogram (OPG) may be helpful for determination of bone involvement.

The present study is an attempt to compare the clinical grading of OSCC with imaging grading of OSCC based on loco-regional spread of malignancy using OPG.

Aim and objectives:

The present study is aimed at comparative evaluation of clinical grading and imaging grading of OSCC in terms of TN staging and stage grouping using OPG

Materials and methods

Prospective cross sectional

Venue of research :
Department of Oral Medicine and Radiology, Department of Oral and Maxillofacial Surgery, Sharad Pawar Dental College, Sawangi (M), Wardha.

Permission was taken from institutional ethics committee of Datta Meghe Institute of Medical Sciences (Deemed University) letter of approval date: 15/12/2014 (Ref. No. DMIMS(DU)/IEC/2014-15/952)

Following cases included in the study,
1. Biopsy proven cases of Oral Squamous Cell Carcinoma.
2. Patients who gives consent to be part of the study.

Thorough case history was taken with all leading questions elaborating the initiation, progression of the pathology along with various predisposing factors. After general examination, clinical examination was performed.

The OPG examination was done in department of Oral Radiology, Sharad Pawar Dental College, Sawangi(M), Wardha. On OPG Machine: Planmeca Proline EC, CR System of FUJI PRIMA (PSP) was used for processing of image. Patient position: patient asked to stand upright and chin was placed on chin rest. Interpretation of images was done using FCR PRIMA CONSOL software.

Blinding of the data:
Soft copies of the OPG was taken and different number were assigned to different cases Clinical findings were also kept confidential to avoid bias. Evaluation was done by two senior oral radiologists Interpretation was done to see

1. Bone involvement
2. Extent of involvement (Size of the lesion)

STATISTICAL FORMULAS

Statistical analysis of comparison of was carried out to find the significant difference between values. Analysis of the data was done by using descriptive and inferential statistics both.

The software used in the analysis were SPSS 17.0, EPI-INFO 6.0 version and Graph Pad Prism 5.0 version and $p<0.05$ is considered as level of significance.

The statistical tests used for the analysis of the result were: Chisquare Test

Results and Observations:

Results showed that there is **no significant difference** between clinical examination of observer 1 and observer 2 for site of the lesions (p=0.98), for cervical lymphnode involvement (p=0.97) , for TN staging (p=0.99) and for stage grouping (p=0.96).

On interobserver variation for **OPG interpretation** (n=72), results showed that there is **no significant difference** between observer 1 and observer 2 for OPG interpretation for presence or absence of bone involvement (p=0.85), for size of the lesion (T staging) (p=0.99) **(Table2)**

On comparative evaluation of clinical findings of with Orthopantamogram findings (n=72). Results showed that there is statistically **significant difference** between the clinical findings and OPG findings. In clinical findings maximum participants are of T2

(65.28%) and T3 (25%) size but in OPG finding maximum participants are of T1(40.28%) and T2(23.61%) **Table 3 and Graph3**.

Discussion :
Although clinical examination is essential for the evaluation of OSCC, but evaluation of deep bone involvement of oral cancer and further evaluation of primary tumor often requires use of imaging modalities. Because Surgical treatment is choice of treatment in various cases which results in morbidity in patients due to sacrifice of involved part and inadequate removal may lead to recurrence of the disease. Hence determination of the extent of spread of OSCC is very important.

Determination of involvement of bone is also an important parameter for pre therapeutic evaluation. It is very difficult to determine the extent of bone involvement clinically. In certain anatomic locations determination of spread of malignancy is very difficult for example OSCC involving floor of mouth and retromolar trigone, sometimes it become very difficult to palpate these areas. In such situations one may take help of imaging modalities .

Imaging strategies vary from patient to patient because of technical considerations as well as the location and extent of the primary tumor. Imaging choices should be guided by knowledge of the potential benefits and pitfalls for each modality.(3,4)

The present study was aimed at comparative evaluation of clinical grading and imaging grading of OSCC in terms of TN staging and stage grouping using OPG.

In the present study age range of the participants was from 30 years to 70 years with mean age 48.86 (± 10.77 years). Maximum patients (29.17%) are between 40 to 49 years **(Graph 1)** this finding is in agreement with Aruna DS et al (17) and Varshney PK et al (13) they also concluded that OSCC is more common in elderly adults. Males(72.22%) are more in number compared to female participants(27.78%) on gender wise distribution **(Graph 2)** of patients. This is because of more habits of tobacco chewing and smoking and betel nut chewing in males compared to females in India (5,6).

For the clinical examination there were two observers who did the clinical examination of the participants at different time with the blinding of diagnosis and clinical findings, as there are chances of subjective variation on clinical findings. On clinical evaluation finding noted about site of the lesion, size of the lesion on inspection and palpation, lymph node examination included level of involvement, size of lymphnode, fixity of lymph node to the underlying structures. On the basis of clinical findings TN staging and stage grouping was established. On statistical analysis there was no significant difference between the two observers. For site of the lesions (p=0.98), for cervical lymphnode involvement (p=0.97) , for TN staging (p=0.99) and for stage grouping (p=0.96) **(Table1).**

Similarly after taking OPG of all 72 participant it was evaluated by two experienced oral radiologists. For blinding of the findings and diagnosis soft copies of the OPG's were taken and assigned numbers to the radiographs and findings was recorded for presence or absence of bone loss. If radiographically evident bone loss present then size of the lesion was recorded. On assessment of interobserver variation on OPG there was no statistically significant difference between the findings of two observers. For presence or absence of bone involvement (p=0.85), for size of the lesion (T staging) (p=0.99)**(Table2)**.

On comparative evaluation of clinical findings with OPG findings, results showed that there is statistically **significant difference** between the clinical findings and OPG findings (p=0.0001,S). In clinical findings maximum participants are of T2 (65.28%) and T3 (25%) size but in OPG finding maximum participants are of T1(40.28%) and T2(23.61%). The finding suggests that the extent of tumor in its third dimension cannot be determined clinically. OPG provides primary picture for bone involvement. It adds third dimension to clinical examination (**Table 3 and Graph 3**).

The findings of present study regarding the use of OPG for grading of OSCC goes in accordance with Hermans R et al 2008 (7) concluded that value of plain radiography studies to stage head and neck cancer is very limited ; these techniques are now replaced by cross sectional imaging modalities (CT & MRI).

As bone invasion is very important parameter for deciding treatment

modality in OSCC it may be used for prognosis formulation. Clinically it is very difficult to rule out bone invasion. In those cases OPG will be helpful to assess early bone invasion in OSCC. If there is extensive bone involvement on OPG they that case may be advised for cross sectional imaging.

Summary and conclusion :
Although there is advancement in the cross sectional imaging modalities for OSCC like computed tomography and magnetic resonance imaging but there is scarcity of such advanced diagnostic setups in various areas in that case conventional imaging modalities may be used for screening purpose. OPG is best modality for determining early bone invasion. It gives third dimension to clinical examination and it may be a primary screening modality to decide further choice of cross sectional imaging.
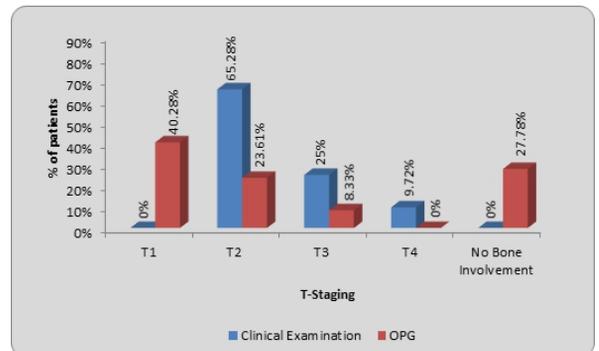
Graph 1: Age wise distribution of patients
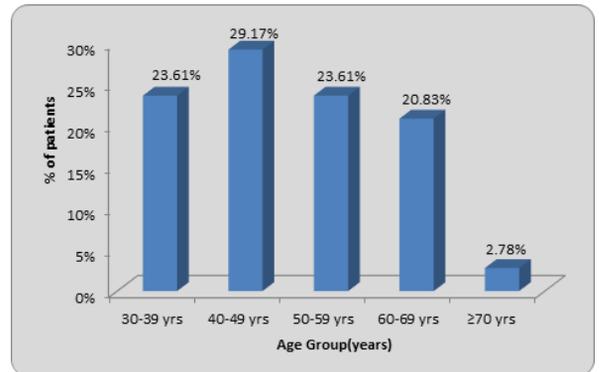
Graph 2: Sex wise distribution of patients
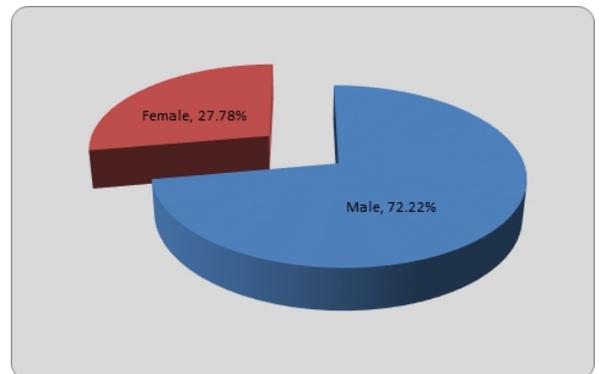
Graph 3 : comparative evaluation of size of tumour(T) of clinical examination with OPG (n=72)

Table 1: Interobserver variation according to clinical examination (n=72)

Clinical Examination	Observer 1	Observer 2	ℵ2-value	p-value
Site				
BM	20(27.78%)	19(26.39%)	0.03	0.98,NS
GB	37(51.39%)	38(52.78%)		
T	15(20.83%)	15(20.83%)		

Lymphnodes				
Level I	64(88.89%)	65(90.28%)	0.0009	0.97,NS
Level II	9(12.50%)	9(12.50%)		
T N Staging				
T2N1	38(52.78%)	39(54.17%)	1.11	0.99,NS
T3N1	16(22.22%)	17(23.61%)		
T3N2b	1(1.39%)	1(1.39%)		
T4A N1	1(1.39%)	0(0%)		
T2N0	8(11.11%)	7(9.72%)		
T2N2	1(1.39%)	1(1.39%)		
T3N2	1(1.39%)	1(1.39%)		
T4N1	4(5.56%)	4(5.56%)		
T4N2	2(2.78%)	2(2.78%)		
Stage Grouping				
Stage II	8(11.11%)	7(9.72%)	0.07	0.96,NS
Stage III	59(81.94%)	60(83.33%)		
Stage IVA	5(6.94%)	5(6.94%)		

Table 2: Interobserver variation for findings on OPG examination (n=72)

OPG Examination	Observer 1	Observer 2	x^2-value	p-value
Bone Involvement				
Present	49(68.06%)	50(69.44%)	0.03	0.85,NS
Absent	23(31.94%)	22(30.56%)		
T Staging				
T1	29(40.28%)	28(38.89%)	0.04	0.99,NS
T2	17(23.61%)	18(25%)		
T3	6(8.33%)	6(8.33%)		
No Bone Involvement	20(27.78%)	20(27.78%)		

Table 3: comparative evaluation of size of tumour(T) of clinical examination with OPG (n=72)

T Staging	Clinical Examination	OPG	x^2-value	p-value
T1	0(0%)	29(40.28%)	76.06	0.0001,S
T2	47(65.28%)	17(23.61%)		
T3	18(25%)	6(8.33%)		
T4	7(9.72%)	0(0%)		
No Bone Involvement	0(0%)	20(27.78%)		

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