

## Clinico-Epidemiological Study of Maxillary Squamous Cell Carcinoma Cases with Infiltration of The Base of The Skull and/or The Orbit

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### ABSTRACT

**Background:** The most common site of sinonasal and paranasal carcinoma is the maxillary sinus, which accounts for 60-70 percent of all cases. Squamous cell carcinoma (SCC) is the most common histopathological type, accounting for 60-75%. Infiltration of the skull base and/or orbit is one of the complications of such tumours which can have a negative impact on one's quality of life. **Objective:** The study looked at the epidemiological characteristics and treatment outcomes of patients with maxillary sinus squamous cell carcinoma (MxSSCC) with skull base and/or orbital invasion who were admitted to Mansoura Clinical Oncology and Nuclear Medicine Department and Tanta Clinical Oncology and Nuclear Medicine Department for treatment between January 2000 and December 2018.

**Patients and methods:** This is a retrospective study. Thirteen patient records fulfilled the eligibility criteria of our study. Females were slightly more in number (7 patients (53.8%). The majority of the cases were of age between 40-69 years (N= 11 patients representing 84.6%). Radiotherapy (RT) was the main line of treatment. It was used as the definitive line in ten patients (76.9%) and surgery with postoperative radiotherapy (PORT) was used in (N=3, 23.1%) patients. **Results:** 5-years overall survival (OAS) of patients with skull base and/or orbital invasion was 15.4% while 2-years progression-free survival (PFS) was 30.8%. **Conclusion:** This study highlights the effect of the skull base and/or orbital invasion on OAS and PFS of patients with MxSSCC.

**Keywords:** Base of skull tumors, Gingival carcinoma, Mandibular carcinoma, Maxillary carcinoma, Orbital infiltrating tumors.

### INTRODUCTION

Because of the close proximity and relative radiosensitivity of adjacent critical structures such as the orbit, central nervous system, and internal carotid artery, treatment of advanced head and neck cancers (HNC) is difficult for both radiation oncologists and surgeons. Obtaining adequate surgical margins in this area is difficult, and is associated with a high risk of postoperative morbidity<sup>(1-2)</sup>. The maxillary sinus carcinoma (MxSSCC) represents 3% of HNC. MxSSCC is accounting for 60 to 75 % of paranasal sinus cancers<sup>(3-5)</sup>. As the maxillary sinus is a pyramidal cavity filled with air, the tumour grows silently with few or no signs and symptoms until it reaches a significant size. Early symptoms are generally nonspecific and similar to common nasal complaints. Because of that the majority of patients are diagnosed at an advanced stage, with >80% of them presented with at least stage T3 disease. that explaining MxSSCC lower survival rates than those of other types of HNC<sup>(6-7)</sup>.

MxSSCC tumor size (T) had the greatest influence on local control, progression free survival (PFS), and overall survival (OAS)<sup>(8)</sup>. Among the complications of such tumors is infiltration of the skull base or/and orbit, which can severely affect the quality of life.

### AIM OF WORK

Studing the epidemiological characteristics and treatment outcome of maxillary squamous cell carcinoma patients with skull base and/or orbital involvement, who were admitted to Mansoura Clinical

Oncology and Nuclear Medicine Department and Tanta Clinical Oncology and Nuclear Medicine Department for treatment through the period from January 2000 to December 2018 inclusive.

### PATIENTS AND METHODS

This is a retrospective analytical study of 13 patients with MxSSCC with skull base and/or orbit involvement who were admitted to Clinical Oncology and Nuclear Medicine Department, Mansoura University Hospital and Clinical Oncology Department, Tanta University Hospital, Egypt between January 2000 and December 2018 inclusive.

#### Inclusion criteria:

- Pathologically proven maxillary sinus or related hard palate SCC.
- Patients with different stages of the disease from stage I to IV.
- Patients of both sex
- Age between (18 - 80 years).

#### Exclusion criteria:

- Patients with other malignancies were excluded.

Various aspects were analyzed in the records such as epidemiology, detailed history, radiological and endoscopic assessment, pathological features of the tumor, the treatment plan, treatment outcome, survival, and patient status at follow-up visits were recorded.

#### Ethical consent:

**An approval of the study was obtained from Mansoura and Tanta University Academic and Ethical Committees. Every patient signed an**

**informed written consent for acceptance of participation in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.**

**Statistical analysis**

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for the Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Qualitative data were represented as frequencies and relative percentages. Survival will be presented with kaplen-Merier curves. Our end points are OAS and PFS. OAS was calculated

since diagnosis till death or last visit. PFS was calculated from end of the treatment till disease progression either recurrence, progression, metastasis, death or last visit.

**RESULTS**

Thirteen cases of MxSSCC cases with skull base and/or orbit infiltration were found. Females' involvement was higher (53.8%). Smokers represented 84.6% of cases. Headache was the commonest symptom. Grade III was the commonest grade (69.2%). The different patient and tumor characteristics are shown in Error! Reference source not found.).

**Table (1): Patient and tumor characteristics**

	<b>Total</b>	
	<b>N</b>	<b>%</b>
<b>Age</b>		
18-39	1	7.7
40-69	11	84.6
70-75	1	7.7
<b>Gender</b>		
Male	6	46.2
Female	7	53.8
<b>Smoking</b>		
Non-smoker	2	15.4
Smoker	11	84.6
<b>Residence</b>		
Urban	10	76.9
Rural	3	23.1
<b>Co-morbidities</b>		
No	5	38.5
Yes	8	61.5
<b>Primary site</b>		
Maxilla	11	84.6
Hard palate	2	15.4
<b>Lymphovascular invasion</b>		
No	3	23.1
Yes	1	7.7
Unknown	9	69.2
<b>Grade of differentiation</b>		
GI	1	7.7
GII	3	23.1
GIII	9	69.2
<b>Tumor extent</b>		
T3	1	7.7
T4	12	92.3
<b>Lymph node status</b>		
Free lymph nodes	2	15.4
Nodal metastasis	11	84.6
<b>Safety margin status</b>		
Free	1	7.7
Close	1	7.7
Positive	1	7.7
Primary radiotherapy	10	76.9
<b>Presenting symptoms</b>		
Headache	6	46.2
Abcess and oral ulcer	2	15.4
Proptosis	4	30.8
Cheek swelling	1	7.7

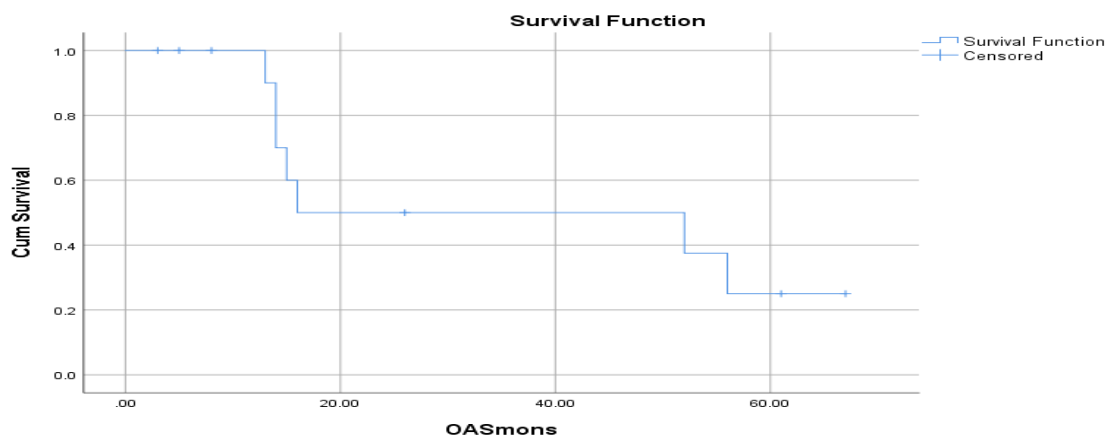
Radiotherapy was the commonest therapy applied (76.9%). The different treatment modalities are shown in Error! Reference source not found.).

**Table (2): The different treatment modalities**

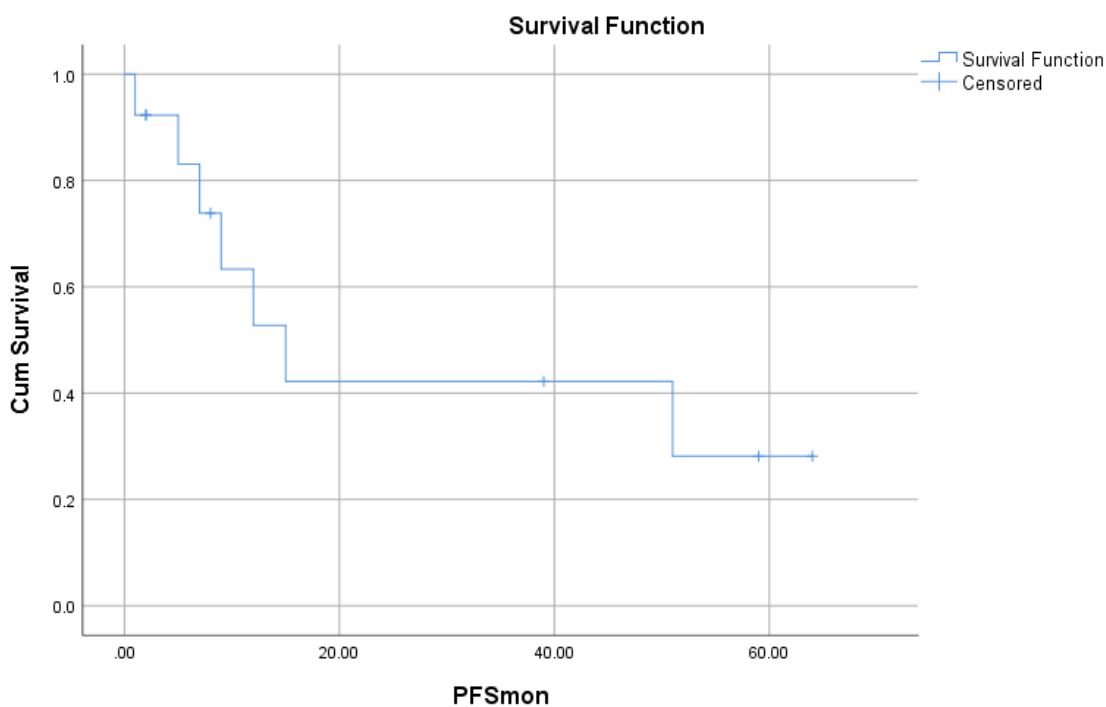
	Total	
	N	%
<b>primary site treatment</b>		
Surgery + PORT	3	23.1
Primary radiotherapy	10	76.9
<b>Neck treatment</b>		
Radiotherapy	10	76.9
Lymph node dissection	3	23.1

*PORT postoperative radiotherapy*

The 2-year progression-free and 5-year overall survivals were 30.8% and 15.4%, respectively as shown in Error! Reference source not found. and 2).



**Figure (1):** Kaplan-Meier curve shows the overall survival of MxSSCC patients with skull base and/or orbital invasion.



**Figure (2):** Kaplan-Meier curve shows the progression-free survival of MxSSCC patients with skull base and/or orbital invasion

## DISCUSSION

One of the most common symptoms presented to dentists, ENT, ophthalmologists, neurologists, oncologists, and other medical professionals is headache. Maxillary tumours infiltrating the skull base and orbit are among the differential diagnoses so it must be considered by all specialties<sup>(9)</sup>.

In this study, MxSSCC cases infiltrating the skull base and/or orbit were 13 cases. The mean of age was 58.7 months (SD:9.3) which matches the results reported by **Sivalingam et al.**<sup>(9)</sup>. Females were commonly affected similarly to studies by **Sliker et al.**<sup>(10)</sup> and **Hayashi et al.**<sup>(11)</sup>. Gender and age weren't statistically significant prognostic factors that affect survival rates that differs with reports of **Sundermann et al.**<sup>(12)</sup> that may be explained by small study sample. Smokers were more than non-smokers similar to **Hayashi et al.**<sup>(11)</sup> and **Sim et al.**<sup>(13)</sup>. Smokers and non-smokers 2-years PFS were 18.2% versus 100% (p = 0.021). Tumor grade of differentiation affect the 5-years OAS. It was 0%,33.3%, and 100% for GIII,GII, and GI respectively (p = 0.019). Our results copes with **Sangal et al.**<sup>(14)</sup> and **Wang et al.**<sup>(15)</sup> reports. Lymphovascular invasion (LVI) had an impact on 5-years OAS. Patients with LVI had 5-years OAS 0% versus 66.7% in patients without LVI (p = 0.019). Neurovascular invasion was found to be significantly related to prognosis. Perineural and LVI were linked to the tumor's localized growth<sup>(16)</sup>.

The commonest treatment modality was radiotherapy (RT) and that copes with the international latest recommendation for locally advanced MxSSCC treatment guidelines<sup>(15,17)</sup>.

Our 2-year PFS and 5-years OAS survival were lower than that reported by **Slevin et al.**<sup>(18)</sup>, **Chopra et al.**<sup>(19)</sup>, and **Suh et al.**<sup>(20)</sup>.

## CONCLUSION

MxSSCC cases infiltrating the skull base and orbit are uncommon tumors. The commonest symptom was headache. Females and smokers represented the commonest cases. RT with or without chemotherapy was the commonest modality used for treatment. The survival was generally less than the published figures for maxillary tumors.

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**Author contribution:** Authors contributed equally in the study.

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