

MAXILLARY SINUS CARCINOMA: AN ANALYSIS OF TEN CASES*

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Abstract **OBJECTIVE:** To evaluate the role, especially of computed tomography, in the staging of maxillary sinus carcinomas. **MATERIALS AND METHODS:** Ten cases of carcinoma treated in Hospital Heliópolis Department of Diagnostic Imaging and Head and Neck Surgery, São Paulo, SP, Brazil, in the period between 1988 and 2002, were evaluated. **RESULTS:** Nine patients presented with tumor extension to the cheek, eight to the masticator space, seven to the mouth floor and hard palate, five to the pterygoid fossa, five to the orbit, three to the ethmoid bone, and one to the skull base. Three of the patients were staged T3, and seven T4. Two patients had lymph nodes metastases at their initial presentation, and were staged T4. All of the cases were histopathologically confirmed. **CONCLUSION:** The accurate analysis of the tumor local extent and dissemination by means of computed tomography and magnetic resonance imaging plays a relevant role in the surgical planning, besides influencing the therapeutic conduct and prognosis.

Keywords: Squamous cell carcinoma; X-ray tomography; Cancer; Maxillary sinus.

Resumo *Carcinoma de seio maxilar: análise de dez casos.*

OBJETIVO: Avaliar o papel, principalmente da tomografia computadorizada, no estadiamento dos carcinomas dos seios maxilares. **MATERIAIS E MÉTODOS:** Foram analisados dez casos de carcinoma diagnosticados e tratados pelos Departamentos de Diagnóstico por Imagem e Cirurgia de Cabeça e Pescoço do Hospital Heliópolis, São Paulo, SP, entre 1988 e 2002. **RESULTADOS:** Nove pacientes tiveram extensão tumoral para a bochecha, oito para o espaço mastigador, sete para o assoalho da boca e palato duro, cinco para a fossa pterigóide, cinco para a órbita, três para o etmóide e um para a base do crânio. Três pacientes foram classificados como T3 e sete, como T4. Dois tinham metástases linfonodais no momento da apresentação inicial, os quais pertenciam ao estágio T4. Todos os casos foram confirmados com exame histopatológico. **CONCLUSÃO:** A análise precisa da extensão local e disseminação tumoral fornecida pela tomografia computadorizada e ressonância magnética desempenha papel importante no planejamento cirúrgico, influenciando, também, na conduta terapêutica e prognóstico.

Unitermos: Carcinoma epidermóide; Tomografia por raios X; Câncer; Seio maxilar.

INTRODUCTION

Maxillary sinus carcinomas are rare, comprising 0.2–0.8% of neoplasms, 3% of head and neck carcinomas, and 80% of all cases of paranasal sinus tumors^(1,2).

The majority of tumors occurring in the maxillary antrum are of epithelial origin and epidermoid carcinomas correspond to more than 80% of all cases of malignant neoplasms, the adenocystic carcinoma being the second more frequent of them⁽²⁾.

The majority of patients present with an advanced stage of the disease at the first symptoms presentation⁽²⁾.

Computed tomography (CT) and magnetic resonance imaging (MRI) are well-established and useful techniques for evaluating the tumor extension to adjacent areas.

MATERIALS AND METHODS

The authors performed a retrospective analysis of ten cases of maxillary sinus

carcinomas diagnosed and treated by Services of Diagnostic Imaging and Head and Neck Surgery at Hospital Heliópolis, São Paulo, SP, in the period between 1988 and 2002 (Table 1).

Seven (70%) patients had epidermoid histological type tumors, and three (30%), adenocystic type. Six (60%) patients were men and four (40%) women. With ages ranging between 37 and 77 years (mean age = 61 years). Seven (70%) patients had a history of tobacco use, and four (40%) alcohol. At the patients' presentation, main symptoms were: pain and edema in the pre-maxillary region (70%), nasal obstruction (20%) and dental pain (30%). All of them underwent CT scan, and two, also MRI. Axial and coronal CT images acquisition was performed with the gantry parallel to the infraorbitomeatal line, 5 mm slice thickness and increment, following intravenous iodine contrast injection.

* Study developed in Service of Diagnostic Imaging at Hospital Heliópolis, São Paulo, SP, Brazil.

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Table 1 List of patients distributed by age, sex, histological diagnosis and clinical staging.

Case	Age	Sex	Histological diagnosis	Stage
1	63	Female	Epidermoid carcinoma	T4N0
2	50	Male	Epidermoid carcinoma	T3N0
3	64	Male	Epidermoid carcinoma	T4N2
4	77	Male	Epidermoid carcinoma	T4N0
5	59	Female	Epidermoid carcinoma	T4N0
6	57	Male	Epidermoid carcinoma	T3N0
7	68	Female	Adenocystic carcinoma	T3N0
8	37	Male	Adenocystic carcinoma	T4N0
9	75	Male	Adenocystic carcinoma	T4N0
10	67	Female	Epidermoid carcinoma	T4N2

Nine (90%) patients had not undergone any treatment before the examination and one (10%) had been submitted to surgery and radiotherapy. The images were evaluated as to tumor site of origin, extent and lymph node involvement, by a 15-year head-and-neck experience Doctor in Radiology. The staging was based on a combination of physical examination with radiological study (CT), and the tumors were classified according to International Union Against Cancer (UICC, 1997), into:

T1 – Tumor confined to the infrastructure antral mucosa, without bony erosion.

T2 – Tumor confined to the suprastructure antral mucosa, without bony erosion, or to the infrastructure, with inferior or medial bony wall destruction.

T3 – Tumor invading any of the following sites: genal skin, orbit, cribriform plate, anterior ethmoid bone or pterygoid musculature.

T4 – Tumor invading the cribriform plate, posterior ethmoid bone, pterygoid plates or the skull base.

RESULTS

Nine patients (90%) presented tumor extension to the cheek, eight (80%) to the masticator space, eight to the maxillary sinus floor and hard palate (80%), seven to the nasal cavity (70%), five to the pterygoid fossa (50%), five to the orbit (50%), three to the ethmoid bone (30%), and one to the skull base (10%). Three patients (30%) were staged as T3, and seven (70%) as T4, none as T1 and T2. Two (20%) patients had T4 lymph node metastasis at their initial presentation. The diagnosis of lymphaden-

opathy was based on physical examination, imaging and cytological studies. Three (30%) patients were submitted only to surgery; four (40%), to surgery and radiotherapy; one (10%), to chemotherapy and one (10%), to chemotherapy and radiotherapy. Correlation with surgical findings has been feasible in seven patients (70%). All of the cases were confirmed by means of biopsy and histopathological study.

DISCUSSION

Approximately 85% of antromaxillary neoplasms are epidermoid carcinomas, and 5% to 15% adenocystic⁽³⁾.

Because of the tumor localization and absence of early symptoms, the patients usually present with advanced tumors at the moment of diagnosis⁽²⁾, and, when the tumors are small sized, they are misdiagnosed as chronic sinusitis, nasal polyp, lacrimal duct obstruction, or even cranial arteritis⁽²⁾. In 40% to 60% of cases there are facial asymmetry, oral cavity swelling and tumor extension to the nasal cavity. These lesions extend medially towards the nasal cavity; superiorly they may invade the orbit and ethmoid sinus; anterolaterally, they may reach soft tissues and cheek; and, inferiorly, the maxillary sinus floor, dental alveolus and palate. Posteriorly, they may reach the pterygopalatine fossa and pterygoid muscles. Through the pterygoid fossa, they may superiorly extend towards the orbital fissure and the cavernous sinus⁽²⁾. All of the ten patients presented with one or more of these extensions.

Adenocystic carcinomas of the maxillary antrum seem to present a more aggres-

sive behavior than those of the salivary glands. Invasion into facial and orbital bones is relatively frequent and affects the skull base. Also, they may reach the meninges and latter the brain; however, generally, there is little or no bone architecture alteration at radiological studies. Another way of spread is by perineural invasion, the maxillary, mandibular and pterygoid nerves, respectively through the round, oval foramens, and pterygoid canal, being the vectors⁽⁴⁾. Two (66.6%) of the three patients with adenocystic carcinoma presented intracranial extension by the tumor.

Lymph node blocks on the neck as an initial presentation are not frequent, appearing in 3% to 20% of cases⁽⁵⁾. This low incidence may be associated with the poor lymphatic draining of the maxillary sinus, or with the clinical inaccessibility for the affected lymph nodes diagnosis⁽⁶⁾. The topographic distribution of lymph node metastasis in the neck usually is dependent on the tumor site, contiguity and high number of capillaries⁽⁷⁾. Patients with tumor extension to the nasopharynx and oral cavity present a higher incidence of cervical metastases than in other regions⁽⁸⁾. In the present study, two (20%) patients had metastases to the upper jugulo-carotid chain, and extension to the oral cavity. St. Pierre and Baker have emphasized the worst prognosis when associated with lymph node metastasis⁽⁹⁾.

Distant metastasis incidence usually is low in cases of epidermoid carcinoma of the maxillary sinus⁽¹⁰⁾, and is more frequent in the poorly differentiated subtype. Frequently, adenocystic carcinoma distant metastases occur tardively⁽⁴⁾. Lungs and bones are the sites most frequently affected⁽¹¹⁾. In our sample, two patients (20%) — one with epidermoid carcinoma (14,2%) and another with adenocystic carcinoma (33,3%) — presented hematogenous metastasis to the lungs, respectively six and ten months following the surgery.

The primary reason for ordering CT and MRI studies in cases of maxillary sinus carcinoma, is for better characterizing the invasion of structures beyond the site of origin⁽²⁾. On CT studies all of the cases present as soft tissue masses in the maxillary sinus cavity, with 70% to 90% of cases evidencing bony destruction⁽²⁾. CT pro-

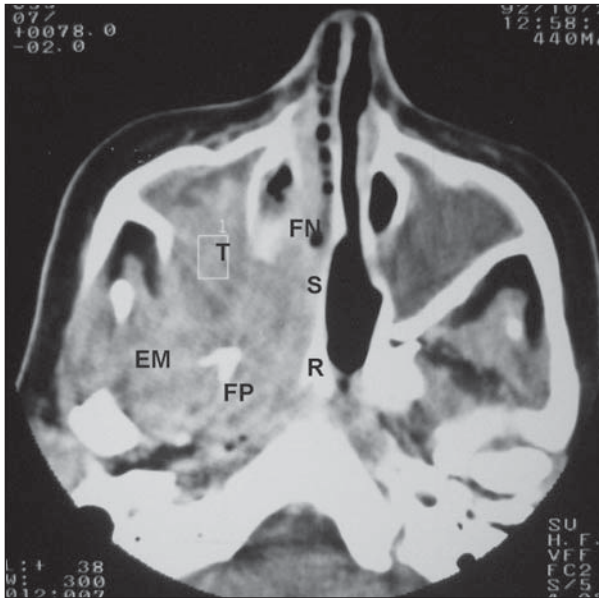


Figure 1

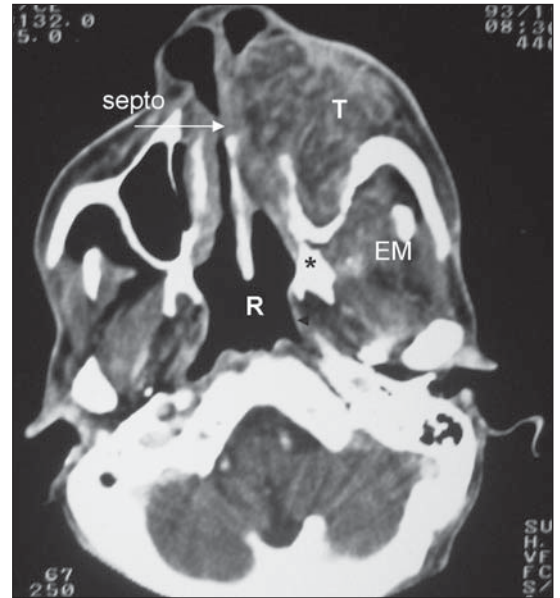


Figure 2

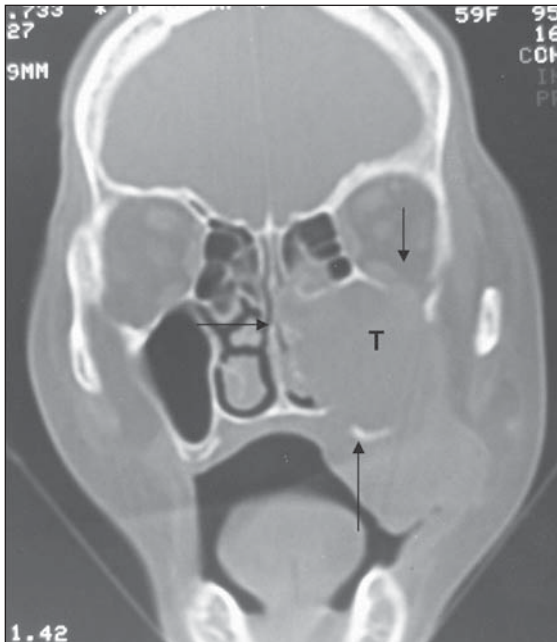


Figure 3

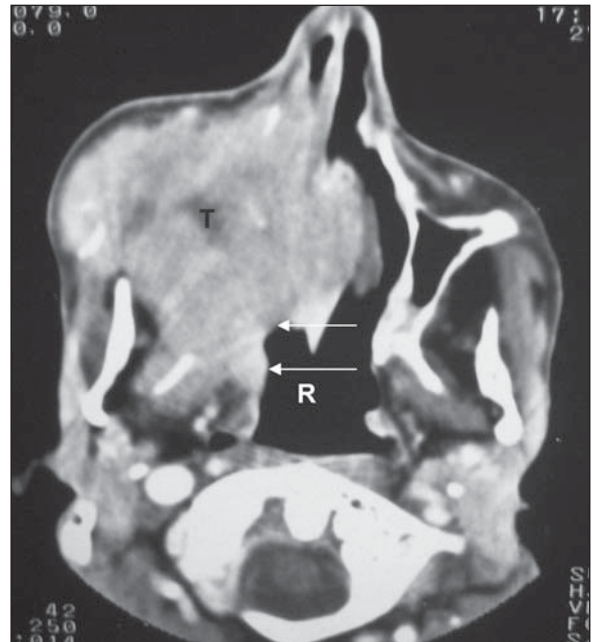


Figure 4

Figure 1. Epidermoid carcinoma. Axial view with soft tissues window. Heterogeneous, expansive lesion (T), with infiltrative aspect, centered on the right maxillary sinus, limited by: medially – sinus wall erosion and extension to the nasal fossa (FN) and nasal septum (S); posteriorly – lesion extending to the rhinopharynx (R); posterolaterally – sinus wall erosion and extension to the pterygopalatine fossa (FP) and masticator space (EM).

Figure 2. Epidermoid carcinoma. Axial view with soft tissues window. Heterogeneous, expansive lesion, with infiltrative aspect at left maxillary sinus (T), limited by: anterolaterally – maxillary sinus wall erosion, with extension to subcutaneous cellular tissue and skin; posterolaterally – maxillary sinus wall erosion, with extension to the masticator space (EM). Also, pterygoid laminae sclerosis (asterisk) is observed; medially – medial maxillary sinus wall erosion, with tumor extension to ipsilateral nasal fossa and septum. Free rhinopharynx (R).

Figure 3. Epidermoid carcinoma. Coronal view with osseous window. Expansive lesion (arrows) of maxillary sinus (T), with medial and anterolateral walls erosion, limited by: superiorly – orbit floor erosion and extension to the ethmoid sinus; inferiorly inferior – hard palate erosion; medially – extending to the ipsilateral fossa, up to the nasal septum.

Figure 4. Adenocystic carcinoma of maxillary sinus. Axial view with soft tissue window. Heterogeneous, expansive lesion (T) of right maxillary sinus, limited by: anterolaterally – sinus wall erosion and extension to the subcutaneous cellular tissue and skin; medially – sinus wall erosion and extension to nasal septum and fossa; posteriorly – infiltrates the rhinopharynx (R and arrows); posterolaterally – sinus wall erosion and extension to pterygopalatine fossa and masticator space.

vides more details of bone involvement than MRI⁽¹²⁾. At MRI, these tumors present middle signal intensity on T1-weighted images and high intensity signal on T2-weighted images, and this method is of help in the evaluation of the posterior cranial fossa, orbit, and perineural/perivascular dissemination, besides allowing the differentiation between retained secretions and neoplastic tissue⁽¹²⁾. Usually, CT and MRI may be complementary in the staging of paranasal sinus tumors, according to Loevner & Sonners⁽¹³⁾. The most effective barrier against tumors propagation is the integrity of the periosteum that is particularly more resistant in two critical areas: the skull base and orbit⁽¹⁴⁾.

The surgery/postsurgical radiotherapy combination results in survival rates higher than those for radiotherapy alone. Tumors causing skull base destruction or involving the internal carotid artery are irresectable. In these cases, even with combined surgery and post-surgical radiotherapy, they do not present a good prognosis, so this method is preferable for patients who have developed distant metastases⁽¹⁰⁾. Radiotherapy is accepted as a palliative method in inoperable cases. Some authors have recommended an aggressive treatment for patients with metastatic disease⁽¹⁵⁾.

The poor prognosis of maxillary sinus carcinoma may be due to the delayed detection of extensive tumors and the impossibility of a complete surgical. The five-year survival rate ranges between 20% and 40%^(2,16). Ohngren has divided the maxil-

lary antrum into posterosuperior and anteroinferior segments, drawing a line from the mandible angle on the profile face image, and has suggested that a tumor confined to the anteroinferior portion could present a better prognosis⁽²⁾. Patients with perineural invasion had an unfavorable prognosis⁽¹⁷⁾. According to the dossiers review, the majority of patients had advanced disease at the moment of admission into the hospital.

CONCLUSION

The accurate analysis of the tumor local extent and dissemination allowed by CT and MRI plays a significant role in the surgical planning, also influencing the therapeutic conduct and prognosis.

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