Unusual presentation of adenoid cystic carcinoma of the maxillary antrum

C. Delbouck*, N. Roper*, C. Aubert**, C. Souchay*, G. Choufani* and S. Hassid*

*ENT Department and **Stomatology Department, Hôpital Erasme, Université Libre de Bruxelles, Belgium

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Abstract. Unusual presentation of adenoid cystic carcinoma of the maxillary antrum. Adenoid cystic carcinoma (ACC) is a rare tumour which affects mainly the major and accessory salivary glands. It is an aggressive neoplasm characterized by early neural invasion and a high incidence of local recurrence and distant metastases, which may develop years after the initial resection. Surgery followed by radiotherapy seems to be the best treatment. Based on a well-illustrated case of extensive maxillary ACC involving the palate, orbit floor, and pterygo-palatine fossa, we discuss the prognosis and the importance of an early diagnosis of ACC.

Introduction

Malignant tumours of the maxillary sinus are relatively uncommon. Nevertheless, several malignant histological types can be found in sinuses, such as squamous cell carcinoma (SCC), adenocarcinoma, adenoid cystic carcinoma (ACC), olfactory neuroblastoma, sinonasal undifferentiated carcinoma, minor salivary gland tumour, melanoma, sarcoma, lymphoma, other rare tumours, and metastatic tumours. Malignancies of the nasal cavity and paranasal sinuses represent only 3% to 5% of all head and neck carcinomas with an annual incidence of 0.5 to 1.0 cases per 100,000 in the population. In this region, the most common tumours are carcinomas, with SCC representing 50% to 80% of malignancies, followed by the glandular tumours like ACC and mucoepidermoid carcinomas. ACC is recognized as an aggressive malignant tumour with a unique natural history. It was first described by Charles Robin and Alexandre Laboulbenne in 1853. In 1856, Billroth called this apparently benign neoplasia “cylindroma” due to its slow growth, its long survival rates, and the non-specific initial symptoms.

The most common origins of this tumour are the major or minor salivary glands, but it can also develop in the serous or mucous glands of the mucosa of the upper aerodigestive tract, pharyngeal region, nose and paranasal sinuses, oesophagus, larynx, and tracheobronchial tract. This tumour may also appear in the lacrimal glands, breast, cervix of the uterus, Bartholin glands, prostate gland, and the skin. ACC is a rare tumour accounting for less than 1% of all head and neck malignancies and less than 10% of all salivary gland neoplasms. They are known for their prolonged natural history and slow growth. This aggressive neoplasm is also characterized by early neural invasion and a high incidence of local recurrence and distant metastases, which may develop years after the initial resection.

We report a well-illustrated case of extensive maxillary ACC involving the palate, orbit floor, and pterygo-palatine fossa. In this case, the primary tumour was not suspected initially because it was not clinically evident. Based on the case report, we discuss the prognosis and the importance of an early diagnosis of ACC.

Case report

A 50-year-old man presented with a 2-year history of right maxillary pain. The patient was a non-smoker and had no history of alcohol abuse. His medical history included hepatitis B infection. His general physical examination gave the appearance of a healthy man. The results of the ENT examination, including nasal endoscopy, were normal and there was no cervical lymphadenopathy. Sinus computed tomography (CT) revealed a well-defined pseudocystic mass which seemed to arise from the right maxillary sinus floor and erode the sinus walls (Figure 1) suggesting a mucocele. Consequently, the patient underwent endoscopic sinus surgery consisting of middle meatal antrostomy and marsupialization...
with drainage of the cyst. The hyperplastic mucosa was sent for histopathologic analysis, which revealed a cribriform adenoid cystic carcinoma (Figure 2).

Afterwards, the patient underwent a full oncologic check-up including cerebral magnetic resonance imaging (MRI), chest CT, abdominal ultrasound, Whole-Body Positron Emission Tomography/Computed Tomography (PET/CT), and another sinus CT showing the extent of the tumour and the resulting bony destruction (Figure 3). No distant metastasis was discovered. A multidisciplinary decision was made that the patient would undergo surgical treatment followed by external radiotherapy. The patient accepted the treatment plan. He underwent a total right maxillectomy followed by dental extractions. Macroscopically, the tumour involved the pterygo-palatine fossa, and had eroded the orbital floor but the periorbita was not involved. The orbital floor was reconstructed with a titanium mesh during the surgical resection (Figure 4). This surgery was well tolerated. The external radiation therapy, 65 Gy in total, was administered 20 days after the operation. A 24-month follow-up showed good healing of the facial scar. The maxillofacial and general examination showed no evidence of the disease or its spread.

**Discussion**

The paranasal sinuses are inaccessible upon routine examination. Cancers of this region typically do
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not become manifest until critical adjacent structures are involved, explaining the advanced stage at diagnosis in our patient. ACC appears most frequently with a definite peak incidence in the fourth through the sixth decades of life. The reported sex ratio differs between authors, ranging from a female predominance to no significant sexual prevalence. Histologically, ACC is characterized by various growth patterns, including cribriform (small darkly staining cells with little cytoplasm that form oval islands of cells), tubular (small dark epithelial cells that form cords), and solid arrangements of hyperchromatic cells with indistinct cell borders (presence of sparse duct-like spaces or small foci of necrosis within the solid masses with a high mitotic activity). Histologic typing is a prognostic factor; the degree of differentiation and prognosis decreases from the tubular to the solid type. This morphological assessment correlates with the degree of ploidy of the DNA.

Solid ACC have a significantly higher incidence of abnormal DNA fragments than tumours with a tubular or cribriform growth pattern. ACC has classically been described as having an indolent and persistent growth, especially by perinervous and perivascular spread. Perineural spread along the cranial nerves and tumour microemboli are thought to be involved in tumour metastasis, making long-term follow-up necessary. The second and third divisions of the trigeminal nerve are among the most common nerves affected by perineural spread. Retrograde spread of ACC along the maxillary nerve (V2) branches often involves the pterygopalatine fossa, orbit, or cavernous sinus.

At the time of diagnosis, the incidence of orbital invasion is between 22-40%. The descending portion of the seventh cranial nerve may also be affected. The reported incidence of cranial base invasion is between 4-22% and mainly occurs in highly advanced stages of the disease. The intracranial extension can be extradural or with intradural infiltration. Symptoms of ACC include nasal obstruction, discharge, epistaxis, facial swelling, pain, visual disturbances, numbness of the cheek and face, and hyposmia/anosmia.

Radiographic studies provide information related to the location, size, extent, and anatomic structures involved. Imaging may guide appropriate biopsy, surgical approaches, staging, and treatment. CT imaging provides the best assessment of the involvement of surrounding bone. MRI with gadolinium is superior in delineating soft tissue detail, both intra-and extracranially. The PET scan is used to identify regional and distant disease.

Successful treatment and patient survival are related to the histological stage, tumour location, size, and early diagnosis of the lesion. Indeed, the prognosis is related to the initial localisation of the tumour. ACC arising in the maxillary antrum have a poorer prognosis due to bone and tissue invasion; therefore, early diagnosis is essential. It is also related to the TNM staging, because 50% of patients with locally advanced disease will have local recurrence despite having had aggressive surgery and radiotherapy.

The sparse lymphatic distribution in the sinonasal tract explains the low occurrence of regional lymph node metastasis of maxillary ACC. Locoregional failure is frequently associated with the development of distant metastasis. The site of distant metastasis is commonly the lungs, axial skeleton, and liver. Prognosis is also related to the surgical margins. Positive surgical margins are directly related with a poorer prognosis. Even with aggressive surgery, 63% of cases have positive histologic margins. Finally, Ki-67 has prognostic value. It is significantly higher in patients with worse prognosis and extensive infiltration. The high Ki-67 values found in tumours with...
more than 30% solid areas indicate that this histological subtype has the highest proliferative activity.13

Many studies report a 5-year survival rate between 40% to 75%3,33,12 and a 10-year survival between 0 to 25%.3,37 The prognosis is better for patients managed with surgery and radiotherapy than for patients administered radiotherapy and/or chemotherapy alone.1 Complete surgical resection of the tumour with clear margins is essential.3 Since ACC is radiosensitive but not radioresistant, radiotherapy alone seems to be indicated only in T4 unresectable tumours.1 Neutron radiotherapy might be superior to conventional radiotherapy.3,37 Neutron beam radiotherapy and gamma knife radiosurgery may be considered for advanced or unresectable ACC and has been shown to provide some benefit in locoregional control.1 Chemo-
therapy (5-fluorouracil, adriamycin, vincristin, or cyclophosphamide) can be proposed for use alone or in association with radiotherapy, but is restricted to palliative ACC patients who have rapidly progressing disease, or recurrent and metastatic disease.5,9

**Conclusion**

The initial prognosis of ACC can be good, but local recurrence and late metastases are common. Most patients present with advanced lesions, often with intracranial or intraorbital extension, and have a poor overall prognosis. Given the low incidence and diverse pathologies of paranasal sinus cancers, it is extremely difficult to perform prospective, randomized clinical trials to compare different treatment approaches. Surgery followed by radiotherapy seems to be the best treatment. Patients need regular follow-up for at least 10 years.

**References**

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Carine Delbrouck, M.D.
ENT Department
University Hospital Erasme
Route de Lennik 808
B-1070 Brussels, Belgium
Tel.: 32 2 555 46 32
E-mail: cdelbrou@ulb.ac.be