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# Advanced squamous cell carcinoma with massive cranial invasion: walking around without a forehead

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## Abstract

Squamous cell carcinomas with widespread invasion of the skull, meninges and brain parenchyma are extremely rare. Herein, we present an 86-year-old man with an 18-year history of sunburn who developed a large osteodestructive SCC that invaded through the frontal bone, frontal sinuses, and the dura mater. No neurological signs or symptoms or distant metastasis were noted. Such cases arise through patient neglect or lack of access to care and pose many challenges as lack of symptoms tend to deceive patients from seeking medical advice. Urgent aggressive treatment by a multidisciplinary team is paramount to achieving a successful outcome.

*Keywords: bone invasion, cancer, carcinoma, invasive tumor, multidisciplinary, squamous cell*

## Introduction

Although squamous cell carcinomas (SCCs) are known to be aggressive tumors and can infiltrate neighboring tissue, its invasion through bone and into soft tissue is rather seldom. This is due to the slow progressive nature of the tumor which usually gets diagnosed before infiltration into the skull [1]. In extremely rare cases however, SCCs can extend through the cranium as well as the dura mater and invade the brain parenchyma [1]. Such cases typically stem from long-term neglect with patients overlooking the fact that a slow growing cutaneous lesion would be of great cause for concern [1-3]. Many patients also report little-to-no symptoms and

even in extreme cases tend to report mostly discomfort and/or inconvenience with aesthetic appearances [2]. Even in cases that involve the CNS, many have been reported to have presented with zero or few neurological symptoms [1-3]. This may relate to the slow progression of the tumor.

## Case Synopsis

An 86-year-old man with an 18-year history of tumor of the scalp was presented. The patient had spent many years in areas of the world with high ultraviolet intensity such as the equatorial zones of Africa and Australia. He noted a number of painful sunburns up to 30 years prior. No concomitant diseases or systemic medication were otherwise documented. He received multiple unsuccessful tumor removal surgeries in the past 18 years with failure to eradicate the growing tumor. At presentation he noted another recurrence of tumor in the scalp, last operated on three years ago; the defect was left to heal by secondary intention.

The last documented imaging analysis including CT with contrast, and PET-CT was conducted 6 months prior to his presentation to us, and detected tumor formation with fronto-parietal localization and signs of complete/extensive osteodestruction, as well as infiltration of the meninges without affecting the brain. All regional lymph nodes, including cervical, supraclavicular mediastinal and axillary nodes, were free from involvement, with no signs of metastasis or any lymphadenopathy on both imaging modalities. The dermatological examination revealed the complete absence of the frontal part of the skull—up



**Figure 1.** **A)** Frontal view, **B)** lateral view, and **C)** posterior clinical view of the patient with complete osteodestruction of *os frontalis* up to *margo parietalis* and a third of *os parietalis* with brain tissue exposed. A central depression with copious purulent discharge as well as a raised peripheral edge consisting of overlapping skin and muscle tissue can be observed.

to *margo parietalis*, one-third of the parietal bone, as the brain tissue in places, and large areas was exposed to direct contact with the dressing, as well as direct contact with the surrounding environment (**Figure 1A**). Clinical destruction of both frontal sinuses was also found, partially overlapped by a slightly elevated residual edge of a skin tumor in the periphery; during inhalation and exhalation the air flow could be felt significantly in the area of the open sinuses. Additionally, a tumor measuring 6.2×4.8cm, hard in consistency, with infiltration of the surrounding tissue and underlying muscles was observed. Ultrasound signs of giant metastasis of squamous cell carcinoma was found preauricularly on the right. It was evident, both clinically and echographically there was giant metastatic spread in the buccal region. However, the patient refused the use of additional testing, including biopsy and additional imaging modalities to further delineate the tumor. The patient was otherwise alert and oriented, with no evidence of meningitis/meningoencephalitis despite copious purulent secretions that were carefully cleared as part of the surgical dressing change.

After extensive discussions with the patient, the possibility of planning an interdisciplinary approach involving neurosurgeons and plastic surgeons was

presented, with a view to complete elimination of the affected bone and the creation of a specific individual prosthesis to cover the defect. At the time of presentation at the multidisciplinary clinic, the patient declined any further surgical treatment. After a multidisciplinary tumor board discussion, a chemotherapeutic treatment strategy and targeted therapy was offered to which the patient also refused.

### Case Discussion

Treatment for such complex tumors often pose great challenges and must be managed by a multidisciplinary approach involving the departments of dermatology, neurosurgery, oncology, plastic surgery, and rehabilitative medicine [3,4]. Preoperative assessment is fundamental to establishing a clear treatment approach with the use of CT contrast to accurately identify the depth of bone invasion; MRI is more precise in detecting any dural or brain involvement. An early and aggressive initial treatment strategy is paramount for a successful outcome [3-5]. In doing so, a radical wide excision should be performed of all affected soft tissues, skull, dura and if necessary,

infiltrated brain to prevent further recurrence. In other words, complete tumor excision with negative surgical margins allows the best positive prognosis [4,5]. The next stage involves complex reconstruction to preserve the large defect including local grafts to replace the dura, personalized prosthesis with titanium mesh to replace the calvarium, and local flaps to cover the full-thickness scalp defects [4,5]. Such cases in which there is bony destruction of the sinuses an additional requirement of bone grafting to stabilize the sinus cavities would be needed. A successful reconstruction, although it poses its own challenges, is best realized by combined efforts from neuro- and plastic surgeons that allow for an effective closure and prompt administration of adjuvant therapy if needed [5].

With such recurrent and advanced stages of squamous cell cancer, systemic therapy is also indicated with or without radiotherapy, especially after failed attempts with surgery and/or radiotherapy [6]. However, the use of systemic treatment is based on the clinical status of the patient. Comorbidities, previous therapy, as well as pathologic characteristics which could influence the treatment outcome must be considered [6].

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Immunotherapy, notably pembrolizumab, with or without chemotherapy has shown to have favorable clinical outcomes in patients with advanced squamous cell carcinoma of the head and neck [6,7]. Several treatment options including pembrolizumab with chemotherapy, cetuximab with chemotherapy, and radiation therapy were offered to our patient based on these novel treatment strategies [6,7]. Unfortunately, our patient went against our advice in taking these treatment options and ultimately chose to receive no treatment.

## Conclusion

Herein, we present an elderly gentleman with a recurrent and highly aggressive SCC of the scalp with dural invasion. He had no other co-morbidities and no signs/symptoms of neurological involvement on presentation. After extensive discussion, he decided to ignore medical advice and did not come back to the multidisciplinary clinics for treatment.

## Potential conflicts of interest

The authors declare no conflicts of interest.