

# Unusual extracranial spread of glioblastoma

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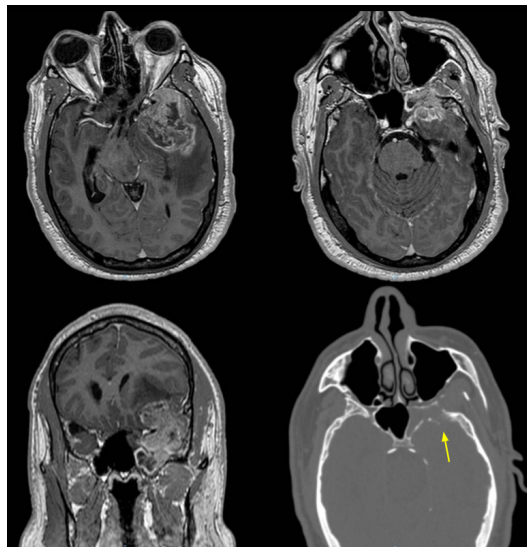
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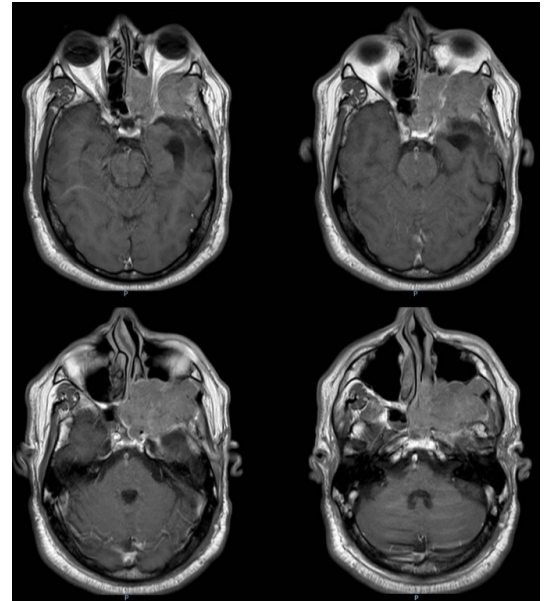
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## DESCRIPTION

We present an unusual case of glioblastoma, which spread to the left sphenoid sinus 13 months after the initial surgery. A 50-year-old man initially presented with a slight right haemiparesis 4+/5 and mild right facial weakness. The brain MRI showed a large contrast-enhancing lesion centred at the left temporal lobe with a possible extension of the mass through the greater wing of the left sphenoid bone into the left sphenoid sinus ([figure 1](#)). The maxillofacial CT scan showed dehiscence of the posterior wall of the left sphenoid sinus. He underwent a left temporal craniotomy with temporal lobectomy and gross tumour resection. There were no evident macroscopic signs of invasion of the dura mater. Intraoperative inspection showed no visible defect at the temporal floor dura. The right haemiparesis improved rapidly after the surgery. Histopathological analysis confirmed the diagnosis of glioblastoma. Biomolecular studies were not performed due to insurance coverage. The patient received radiotherapy for a total of 60 Gy plus continuous daily temozolomide, followed by 10 monthly cycles



**Figure 1** Initial admission T1 brain MRI with gadolinium enhancement shows a lesion centred at the left temporal lobe, measuring approximately 4.6 cm×3.7 cm×4.3 cm with peripheral enhancement and areas of necrosis at its most superior portion, causing a 1.1 cm left to right midline shift (axial—top row). There is a possible extension of the mass through the greater wing of the left sphenoid bone into the left sphenoid sinus (coronal—bottom row, left). The maxillofacial CT scan in the bone window (axial—bottom right) showed dehiscence of the posterior wall of the left sphenoid sinus (yellow arrow).



**Figure 2** Second admission axial T1 brain MRI examination with gadolinium enhancement shows a large extra-axial mass centred within the left aspect of the sphenoid bone, measuring 7 cm×5.3 cm×4.0 cm. There is an extension into the left ethmoid, sphenoid and maxillary sinuses. There is also the involvement of the left orbital canal and orbital apex with extension to the left posterior nasal cavity and masticator space.

of adjuvant temozolomide therapy. The brain MRI performed 6 months after the radiotherapy showed no signs of disease recurrence.

Thirteen months after the first operation, he started reporting headaches. He had a Karnofsky score of 90. Neurological examination revealed an alert and oriented patient with left eye proptosis. Cranial nerve examination revealed hypoesthesia at the left trigeminal nerve maxillary division distribution. Extraocular movements were intact. The motor and sensory system examination disclosed no abnormality. Visual acuity at 6 feet was 20/25 on the right and 20/20 on the left. There was a left relative afferent pupillary defect and optic nerve swelling. The brain MRI showed a large extra-axial mass centred within the left aspect of the sphenoid bone with an extension into the left ethmoid, sphenoid and maxillary sinuses. The left orbital canal and orbital apex were also involved with extension to the left posterior nasal cavity and masticator space ([figure 2](#)). The anterior pole of the left superior temporal lobe and the left mesial temporal lobe showed small enhancing areas suggestive of recurrent intracranial disease. Intravenous chemotherapy was started, and he was alive at the last follow-up



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18 months after his initial diagnosis, still with a Karnofsky score of 90.

Glioblastoma is a WHO grade IV aggressive and malignant brain tumour. Extracranial spread of the tumour is uncommon.<sup>1,2</sup> The anterior and middle fossa floor provides an important route for the direct transdural extension of the tumour.<sup>2</sup> Various hypotheses regarding extracranial spread had been proposed. The tumour can extend through a dural slit or can herniate through the dura due to increased intracranial pressure over a long time.<sup>2-4</sup> Tumorous cells can infiltrate and destroy the dura.<sup>5</sup> The tumour can also migrate across the dura mater through the cranial nerve foramina.<sup>6,7</sup> All of these mechanisms may lead to an invasion of the skull base with infiltration of bones, neighbouring soft tissues, paranasal sinuses, orbit and infratemporal fossa.<sup>1,8,9</sup>

### Learning points

- ▶ Glioblastoma is a tumour that can spread extracranially through the dura mater.
- ▶ Glioblastoma can invade and destroy the skull base and grow at the neighbouring soft tissues, paranasal sinuses, orbit and infratemporal fossa.

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