Unusual Recurrence Pattern in Peritorcular Meningioma
—Case Report—

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Abstract

A 45-year-old female presented with a recurrent peritorcular meningioma. The recurrence was very unusual as the tumor arose from the confluens sinuum and extended to the left jugular bulb completely within the sinuses, obstructing the venous outflow. However, there were no clinical symptoms or neurological abnormalities, due to the development of collateral circulation. The possibility of intrasinus recurrence should always be considered in patients with tumor invasion to sinus walls, even if the patient has no clinical symptoms or neurological abnormalities.

Key words: peritorcular meningioma, meningioma recurrence, venous extension

Introduction

Peritorcular meningiomas were first described as a distinct entity in 1938, when 12 were identified among 77 parasagittal meningiomas. Peritorcular meningiomas have been reported in series of posterior fossa and tentorial meningiomas at frequencies of 5.3%, 3.7%, and 13.1%, but only three individual cases have been described.

The incidences of tentorial and posterior fossa meningiomas are 5% and 10% of all intracranial meningiomas, respectively. The overall incidence of peritorcular meningioma is therefore about 1% of intracranial meningiomas.

We report a case of recurrent peritorcular meningioma, in which the pattern of recurrence was very unusual, with the tumor growing completely within the sinuses and obstructing the normal venous outflow without clinical symptoms or neurological signs.

Case Report

A 45-year-old female was admitted on August 7, 1991 with a 4-month history of headache and nausea and a 1-month history of declining visual acuity. She had no notable past history. General, physical, and neurological examination found no abnormalities except for papilledema. Computed tomography (CT) revealed a high density mass (7 × 4 × 5 cm) with perifocal edema in the right occipital lobe, with marked postcontrast homogeneous enhancement. Magnetic resonance (MR) images demonstrated a low signal mass on the T1-weighted images, which

Fig. 1 T1-weighted Gd-enhanced coronal MR images at first admission showing disappearance of the flow void of the right transverse sinus (arrow) due to compression or invasion by the tumor.
was enhanced homogeneously after administration of gadolinium (Gd). Coronal MR images showed obstruction of the right transverse sinus due to compression or invasion by the tumor (Fig. 1). The preoperative diagnosis was tentorial meningioma.

The first operation was performed via a right occipital craniotomy and suboccipital craniectomy on August 14, 1991. The tumor was subtotally removed with partial resection of the right transverse sinus. Tumor cells adjacent to the confluens sinus may not have been extirpated. The histological diagnosis was fibroblastic meningioma with hypercellularity and no malignancy. Her postoperative clinical course was uneventful with no neurological deficits and she was discharged. Postoperative MR images showed no residual tumor.

MR images on December 10, 1992 revealed recurrence of the tumor on the left side of the confluens sinus. Serial MR images showed tumor growth within the left transverse and sigmoid sinuses, extending from the confluens sinus to the left jugular foramen (Fig. 2). Neurological examination on the second admission on March 24, 1993 was normal. Bilateral carotid angiograms showed an interruption in both the superior sagittal sinus and the straight sinus caused by the extension of the recurrent tumor. The left transverse sinus and the left sigmoid sinus were not visualized. A defect in the medial part of the right transverse sinus was seen because the right transverse sinus had been partially resected at the first operation. Cerebral blood drainage was maintained by the right sigmoid sinus, the left inferior petrosal sinus, and many diploic veins (Fig. 3). The tumor stain could be seen in the venous phase of the vertebral angiogram. A retrograde venogram of the left internal jugular vein showed the obstruction caudal to the inferior petrosal sinus (Fig. 4).

On March 29, 1993, a second operation was performed via a left suboccipital craniectomy and occipital craniotomy next to the previous craniectomy. The left sigmoid sinus was completely exposed by shaving the bone of the mastoid process. Although the tumor protruded at the confluens sinusum, the overlying bone was intact. The tumor was completely within the sinuses and macroscopically had not invaded or adhered to the occipital lobe or cerebellum. The tumor in the sinuses was completely removed in two pieces, and the tumor at the confluens sinusum was removed en bloc after cutting the superior sagittal and straight sinuses. After cutting the cerebellar tentorium and ligating the vein of Labbé, the left transverse and sigmoid sinuses were resected en bloc together with the intrasinus tumors. The proximal end of the sinus was sutured at the jugular bulb. Finally, a dural plasty was performed with lyophilized dura in the supra- and infratentorial regions. Histological examination of the resected specimen showed high cellularity, but no mitosis or malignancy. The histological diagnosis was transitional meningioma (Fig. 5).

Her postoperative course was uneventful. Postoperative CT scans showed no swelling of the left temporal lobe or other abnormalities. She was discharged with no neurological deficits.

Fig. 2  T1-weighted Gd-enhanced coronal MR images at recurrence showing a round nodule at the confluens sinuum and extension of the tumor within the sinuses to the left jugular bulb (arrow).
Fig. 3 Venous phase of bilateral carotid angiograms at recurrence showing interruption of the superior sagittal and straight sinuses (arrowheads), complete absence of the left transverse and sigmoid sinuses, partial defect of the right transverse sinus after the first operation, and collateral circulation (arrows). upper: right lateral view, lower: left lateral view.

Fig. 4 Retrograde venogram of the left internal jugular vein (lateral view), showing an obstruction (arrow) due to the tumor extension (arrowheads: internal jugular vein).

Fig. 5 Photomicrograph of the tissue resected at the second operation showing hypercellularity but no mitosis. Hematoxylin and eosin stain, x 40.

Discussion

The most interesting point of our case was the unusual nature of the recurrence, in that the tumor arose from the dura of the torcular Herophili and extended to the jugular bulb via the left transverse and sigmoid sinuses. In addition, the recurrent tumor was localized in the venous sinuses. This pattern of tumor growth has not previously been reported, although a photograph showing intraluminal tumor growth has been published.3)

Cushing and Eisenhardt14 found that clinical signs and symptoms reflected either occipital and cerebellar compression or intracranial hypertension secondary to venous outflow obstruction. Our patient did not present with any complaints or neurological abnormalities at the second admission. The absence of clinical symptoms might be expected because the intrasinus extension of the tumor did not cause occipital or cerebellar compression. No intracranial hypertension was seen despite the complete venous obstruction by the tumor extension in the sinuses. This was probably due to the development of collateral circulation, including diploic, emissary, and scalp veins maintaining the drainage of the cerebral blood flow.

Suzuki et al.18 and Tanaka et al.19 have suggested that a persistent falcial sinus and dural venous channels in the tentorium would develop in cases of complete obstruction of the normal venous drainage due to invasion of tumors such as torcular or straight sinus meningiomas. Angiograms showed a well-developed collateral circulation, such as the diploic veins,
but no unusual dural veins were present in our patient. It is therefore very important not to sacrifice the collateral circulation and to preserve the tentorium or the dura, which may keep unusual venous channels open.

In our patient, the tumor recurrence within the sinus was detected by follow-up MR imaging. Later discovery of the tumor recurrence or tumor extension to the extracranial jugular vein would have complicated the surgical strategy. Moreover, the possibility of extracranial metastases would be greater.

Extracranial metastases of meningioma are extremely rare and the incidence is said to be less than 0.1%.\textsuperscript{16} Extracranial metastases may be more common in malignant meningiomas such as angioblastic or parasagittal meningiomas,\textsuperscript{4,5,7,11,13} but this is controversial.\textsuperscript{6,15} Nevertheless, dural invasion of the tumor does increase the possibility of extracranial metastases.\textsuperscript{4,9,11,14} We therefore stress the importance of follow-up examinations after the removal of tumor involving venous sinuses.

Histological subtypes of periorcular meningiomas are rather malignant, with one half of the cases angioblastic in the Cushing and Eisenhardt series.\textsuperscript{1} The three reported cases were fibroblastic,\textsuperscript{18} angioblastic,\textsuperscript{17} and papillary meningiomas.\textsuperscript{10} In our patient, the resected specimens from the first and the second operations were classified as fibroblastic and transitional types, respectively. While neither type is thought to be malignant, higher cellularity than normal in meningioma was observed.

Periorcular meningiomas are very rare, but the possibility of intrasinus extension or tumor recurrence should be considered postoperatively, even in the absence of clinical symptoms or neurological findings. If tumor recurrence within the sinuses is detected, extensive preoperative angiography is mandatory.

References

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