Hypothalamic Pilocytic Astrocytoma Presenting with Intratumoral and Subarachnoid Hemorrhage
—Case Report—

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Abstract

A 45-year-old male presented with sudden onset of severe headache. Computed tomography and magnetic resonance imaging demonstrated an irregularly enhanced suprasellar mass with intratumoral and subarachnoid hemorrhage. The mass was removed in two operations. Histological examination of the tumor revealed pilocytic astrocytoma. The relatively rich vascularity and perivascular tumor cell proliferation observed in this benign lesion were probably the causes of this extremely rare association.

Key words: hemorrhage, hypothalamus, pilocytic astrocytoma

Introduction

Hemorrhage is associated with 3.7% to 12% of all gliomas. Malignant glioma and glioblastoma multiforme have a higher incidence of hemorrhage than low-grade astrocytomas. When asymptomatic cases as well as autopsy cases are included, the incidence of hemorrhage in low-grade astrocytoma is 4% to 12%. We describe such a case of intratumoral and subarachnoid hemorrhage from a hypothalamic pilocytic astrocytoma and discuss the causative factors.

Case Report

A 45-year-old male suffered sudden onset of severe headache. On admission, he was disoriented, and his right visual acuity was decreased. Computed tomography (CT) revealed subarachnoid and intraventricular hemorrhage accompanied by a suprasellar hematoma. CT with contrast administration demonstrated an enhanced suprasellar mass (Fig. 1). Cerebral angiography demonstrated slight lateral displacement of both carotid arteries and elevation of both proximal anterior cerebral arteries. No cerebral aneurysm or tumor stain was present. His consciousness soon cleared, but bitemporal hemianopsia was noted 3 days later. Magnetic resonance (MR) imaging 3 days after admission demonstrated a suprasellar mass containing a subacute hematoma and irregular areas of enhancement with sharp margins (Fig. 2).

Four days after admission, the mass and the hematoma were partially removed via a right pterional approach to relieve the visual symptoms and determine the histology. The optic chiasm was prefixed and exposure was limited through the lamina terminalis approach, so a significant tumor volume remained in the hypothalamic region as shown by postoperative MR imaging. Histological examination of the tumor specimen showed a typical pilocytic astrocytoma with a mixture of compact fibrillary areas and microcystic foci containing Rosenthal fibers. Vascularity was relatively rich, and perivascular proliferation of tumor cells was also seen (Fig. 3).

Two months later, the residual tumor was removed using a right orbitozygomatic approach and endoscopic visualization of the subchiasmal region. Postoperatively, the visual disturbance on the right partially recovered, but left temporal hemianopsia was unchanged. MR imaging showed small amount of tumor after the second operation. No adjuvant therapy was given. Six months later, MR imaging demonstrated no regrowth of the residual tumor. The patient returned to daily life and his previous job.
Fig. 1 Axial computed tomography scans showing massive hematoma and subarachnoid hemorrhage in the suprasellar region. The blood clot is seen in the aqueduct and fourth ventricle (upper row). The left side of the suprasellar mass is enhanced after contrast administration (lower row).

Fig. 2 Coronal T1-weighted magnetic resonance image showing an isointense suprasellar mass with a high intensity center suggesting subacute hemorrhage (left). The mass is enhanced in an irregular pattern after gadolinium administration (right).

Fig. 3 Photomicrographs demonstrating an astrocytic tumor with compact fibrillary and microcystic areas. Perivascular proliferation of tumor cells (arrowheads) (left: HE stain, ×100) and Rosenthal fibers are visible (arrows) (right: HE stain, ×400).

Discussion

Bleeding from intracranial tumors may occur due to the following mechanisms: endothelial proliferation and obstruction of the tumor vessels causing tumor necrosis and hemorrhage; disruption of tumor vessels by tumor expansion; or direct tumor infiltration into vessels. Such findings are relatively common in malignant tumors. Pilocytic astrocytoma has a vascular architecture resembling malignant gliomas in some respects, sometimes including glomeruloid vascular structures and perivascular tumor cell arrangements. In our case, the latter feature was present. Increased vascularity within benign astrocytoma may be a risk factor for hemorrhage, but hemorrhage has not been conclusively linked to this vascular structure. The causes of bleeding appear to be multifactorial, including arterial hypertension, increased intracranial pressure, and congestion of surrounding vessels. The tumor in our case occupied the suprasellar region where many vessels were present, so compression of these vessels by the large mass may have been responsible for the hemorrhage.

Pilocytic astrocytoma is uncommon, and hemorrhage from pilocytic astrocytoma is extremely rare with only two previously reported cases. Pilocytic astrocytoma usually develops before the age of 45 years. The diagnosis in this case was based on the histological findings of Rosenthal fibers and the typical architecture consisting of loose arrays of stellate...
astrocytes in microcystic areas with compact tissue elsewhere containing elongated fibrillary cells.\textsuperscript{3,6} The neuroimaging findings of a well-circumscribed mass with a cystic component supported this diagnosis.\textsuperscript{3} Radical removal of the tumor was avoided even though the border between the tumor and the brain was sharp, since serious clinical deterioration after total removal of hypothalamic astrocytomas has been reported,\textsuperscript{3} and these tumors grow slowly over several decades.\textsuperscript{3} However, since malignant pilocytic astrocytoma has been reported in adults,\textsuperscript{3} careful observation is mandatory.

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References

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