Anaplastic Oligoastrocytoma With a Sarcomatous Component Presenting With Apoplectic Intracerebral Hemorrhage—Case Report

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Abstract

The authors present a case of apoplectic intracerebral hemorrhage (ICH) caused by an anaplastic oligoastrocytoma. A 76-year-old man presented to our hospital with epileptic seizures. A well-demarcated mass was noted at the right temporal lobe upon magnetic resonance imaging and computed tomography scanning. Because the radiological findings of the mass were nonspecific, patient follow-up was planned. Two months later, the patient developed a massive ICH at the previously noted area of the right temporal lobe. Right temporal craniotomy was performed to evacuate the ICH, and purplish tissue was found at the hematoma cavity rim. This tissue was excised separately for histologic examination. The tumor was diagnosed as an anaplastic oligoastrocytoma with a sarcomatous component (WHO grade III). Postoperatively, the patient was given a combination of radiation and temozolomide therapy. Thereafter, he remained well for 54 months, at which time regrowth of tumor was detected. The patient died of pneumonia 60 months after his initial presentation to our hospital. Oligodendrogliomas and oligodendroglial tumors (OLIGO tumors) most often present with seizures, rarely with apoplectic ICH. Only 1 case report exists of ICH as the initial clinical presentation. Although no explanation has yet been provided as to why apoplectic ICH arising from an OLIGO tumor is such an uncommon event, the ICH might be related to the spontaneous rupture of abundant blood vessels with increasing obliteration within the tumor.

Key words

Intracerebral hemorrhage, Brain tumor, Cerebral apoplexy, Anaplastic oligoastrocytoma

Introduction

Intracerebral hemorrhage (ICH) caused by a brain tumor is rare\(^1\)-\(^6\). The majority of reported cases of ICH resulting from a brain tumor involve high-grade astrocytoma or metastatic brain tumor\(^1\)-\(^6\). Oligodendrogliomas and oligodendroglial tumors such as anaplastic oligodendroglialomas and oligoastrocytomas (OLIGO tumors) most frequently present with seizures\(^7\)-\(^9\); only rarely do they present with massive ICH\(^9\).

We describe our experience with a patient who initially presented with seizures, then later with apoplectic ICH for which anaplastic oligoastrocytoma was shown to be the cause.

Case Report

History and Presentation. A 76-year-old man was admitted to the emergency room at our institution because of epileptic seizures. Magnetic resonance imaging (MRI) revealed a well-demarcated mass, 2 cm in diameter, located superficially at the right middle temporal gyrus. The mass was hypointense on T1-weighted images (Figure 1a), hyperintense on both T2-weighted (Figure 1b) and FLAIR images (Figure 1c), and less enhanced on Gd-DTPA images (Figure 1d). The patient was given prophylactic antiepileptics. Because the MRI findings were nonspecific, follow-up was planned. Two months later, the patient experienced a sudden, severe headache; he
Figure 1. MRI was performed upon initial presentation. A well-demarcated mass was seen at the right temporal lobe. The mass is hypointense on the T1-weighted (a) image, hyperintense on both T2-weighted (b) and FLAIR (c) images, and less enhanced on the Gd-DTPA (d) image.

Figure 2. CT scanning was performed upon the second presentation. A massive ICH was seen at the previously noted area of the right temporal lobe on the plain CT scan (a) and enhanced CT scan (b).

became progressively less responsive and lapsed into unconsciousness. He was brought to our emergency room again. Upon arrival, neurologic examination showed the patient to be in a state of stupor, with hemiparesis involving the left upper and lower extremities. Computed tomography (CT) scanning
Oligoastrocytoma presenting with ICH

showed a midline shift and massive ICH at the previously noted area of the right temporal lobe (Figure 2a). Contrast enhanced CT showed no enhancement effect (Figure 2b).

Surgery. Right temporal craniotomy was performed to evacuate the hematoma. Tissue on the temporal surface at the rim of the hematoma cavity appeared purplish. This tissue was excised separately for histologic examination. The patient regained consciousness postoperatively, and the hemiparesis improved quickly.

Histologic Examination. Hematoxylin and eosin-stained sections of the surgical specimen revealed cells with bright vacuole and cytoplasm (Figure 3a), and these were positive for glial fibrillary acidic protein (GFAP) (b) and oligo-2 (c). Also present were spindle-like cells arranged in a storiform pattern. Many bleeding capillaries were seen in the stroma (Figure 3a). The MIB-1 labeling index was 40% (Figure 3d). The tumor was diagnosed as an anaplastic oligoastrocytoma with a sarcomatous component (WHO grade III).

Postoperative Course. The patient was treated with a combination of focal radiation (60 Gy) and temozolomide. After completion of the therapeutic regimen, the patient remained well for 54 months, at which time regrowth of the residual tumor was detected by MRI. His condition deteriorated steadily thereafter, and he died of pneumonia 60 months after his initial presentation to our hospital. Postmortem study was not performed.

Discussion

ICH is an uncommon but recognized initial presentation of brain tumors. According to radiologic and pathologic studies, the incidence of ICH due to
brain tumor ranges from 0.6% to 14.6%, with an average of 2–3%\(^1\)\(^3\)\(^4\)-\(^6\). Furthermore, the incidence of brain tumor in cases of ICH ranges from 2.5% to 7.2%\(^1\)\(^3\). Any type of brain tumor can cause ICH, but the incidence of ICH varies widely among the different tumor types. Generally, high-grade astrocytoma and metastatic brain tumors are thought to be highly associated with ICH, whereas ICH arising from benign brain tumors such as low-grade astrocytoma and meningioma is rare\(^3\)-\(^5\). In cases of OLIGO tumors, microscopically proven but clinically unrecognized intratumoral hemorrhage is not uncommon\(^7\)-\(^9\). However, OLIGO tumors presenting with macroscopically apparent hemorrhage that seems to have some impact on the clinical course are quite rare. To our knowledge, only 1 case of apoplectic hemorrhage as an initial clinical presentation of OLIGO tumor has been reported in the literature\(^2\).

The symptoms of OLIGO tumors do not reliably distinguish them from other types of brain tumor\(^7\)-\(^9\). Seizures are the most common presenting initial symptom, ranging in incidence from 35% to 85% of patients\(^8\). Upon CT scanning\(^8\), OLIGO tumors appear hypodense or isodense and are enhanced poorly or not at all. Upon MRI, they are typically hypointense on T1-weighted images, hyperintense on T2-weighted images, and less enhanced on Gd-DTPA images. Because both clinical symptoms and radiologic findings in cases of OLIGO tumors are nonspecific, patients with oligodendrogliotum tumor often experience symptoms (usually seizures) for a number of years prior to diagnosis\(^7\)-\(^8\). The patient in our case was awaiting follow-up after experiencing epileptic seizures for which MRI findings were not specific enough to substantiate a proper diagnosis.

Various theories explaining the etiology of ICH arising from brain tumors have been proposed\(^1\)-\(^5\). The mechanism could be endothelial proliferation followed by vascular obliteration, vessel compression and distortion due to tumor growth, or tumor invasion of the vessel walls. In OLIGO tumors with abundant vessel formation, the vascular structure is composed chiefly of thin-walled capillaries with an angiomatic appearance, resulting in endothelial proliferation and necrosis\(^2\)-\(^7\). In our patient, there were many small bleeding capillaries. We postulate that the spontaneous rupture of these abundant vessels and the increasing vascular obliteration contributed to the pathogenesis of the ICH; however, no explanation has yet been provided as to why apoplectic ICH arising from an OLIGO tumor is such an uncommon event.

### Conclusion

OLIGO tumor should be considered in the differential diagnosis of unexplained intracerebral hemorrhage.

### Conflict of Interest Disclosure

The authors report no conflict of interest concerning the materials or methods used in this case or the findings described herein.

### References