Meningioma Associated with Chronic Subdural Hematoma and Meningothelial Cell Cluster within the Hematoma Capsule

—Case Report—

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Abstract

A 47-year-old female presented with an unusual association of convexity meningioma with chronic subdural hematoma, manifesting as headache and left hemiparesis 10 days before admission. Computed tomography showed an isodense right frontal tumor with significant enhancement postcontrast and a hypodense subdural hematoma in the right frontotemporal area. Craniotomy exposed an extracerebral tumor facing a liquefied subdural hematoma encapsulated by outer and inner membranes. The hematoma was evacuated and the tumor was totally removed. Histological examination revealed a meningothelial meningioma with hemangiopericytic components. Microscopic examination of the hematoma capsule revealed a cluster of meningothelial cells in the outer membrane.

Key words: chronic subdural hematoma, intracranial hematoma, meningioma, microtumor, tumor bleeding

Introduction

Meningioma is apparently the most likely tumor to be associated with chronic subdural hematoma because of the extracerebral location and chronic nature. Nevertheless, meningioma is most commonly associated with intracerebral hematoma and acute subdural hematoma. Intracranial hemorrhage is far more rare in association with benign than with malignant intracranial tumors. In particular, chronic subdural hematoma is very rarely associated with meningioma.

We describe a 47-year-old female with a meningioma associated with a chronic hematoma containing an unusual cluster of meningioma cells within the outer membrane of the hematoma.

Case Report

A 47-year-old female was admitted with a 10-day history of headache and left hemiparesis. Her personal history was unremarkable. She denied any head trauma. On admission, neurological examination revealed an alert, oriented patient with mild left hemiparesis. Computed tomography (CT) demonstrated an isodense right frontal, high-convexity tumor with significant enhancement postcontrast and a hypodense birescentic hematoma in the right frontotemporal area. Cerebral angiography demonstrated downward displacement of some frontal and parietal branches of the middle and anterior cerebral arteries. External carotid angiography revealed a dilated middle meningeal artery feeding the tumor.

A right frontal craniotomy exposed an extracerebral tumor facing a liquefied, but partially gelatinous, subdural hematoma. The hematoma was encapsulated by two well-developed membranes, a thick outer and a thin inner membrane, covering and adhering loosely to the anterior part of the tumor. The hematoma was evacuated and the tumor, together with its dural attachments, was totally removed. Histological examination revealed a meningothelial meningioma with hemangiopericytic components. Microscopic examination of the hematoma capsule revealed a cluster of meningothelial cells in the outer membrane.
Histological examination of the tumor demonstrated a predominantly meningothelial type of meningioma with hemosiderin deposition and some hemangiopericytic components (Fig. 2). The hematoma membrane consisted of granulation tissue formed by fibroblastic proliferation with a typical sinusoid channel layer. The outer membrane of the hematoma contained a small cluster of meningothelial cells, similar to those of the tumor, with whorl formation (Fig. 3). The cell cluster was separate from the dura mater and the tumor.

Left hemiparesis improved immediately after surgery. A postoperative CT scan detected neither subdural hematoma nor residual tumor.

Discussion

Table 1 lists previously reported cases of meningioma associated with chronic subdural hematoma. Except in one patient reported by Kotwica and Zawirski,10) the accompanying hematomas were adjacent to the tumor. Itoyama et al10) reported a patient with bilateral hematomas. No patient experienced trauma which definitely caused the hemorrhage. The location of the tumor was supratentorial in all patients: convexity in seven, sphenoidal ridge in two, parasagittal in one, and olfactory groove in one. The most common histological subtype was meningothelial (5), followed by transitional (2), angiomatosus, angioblastic, and sarcomatous (1 each). There were no correlations between the location or histological subtype of the meningioma and the likelihood of chronic subdural hematoma.

Meningioma may promote or contribute to the formation of a hematoma within the subdural space by...
Table 1  Reported patients with meningioma associated with chronic subdural hematoma

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Age/ Sex</th>
<th>Meningioma Location</th>
<th>Meningioma Histology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cusick and Bailey (1972)</td>
<td>47/F</td>
<td>rt convexity</td>
<td>transitional</td>
</tr>
<tr>
<td>Modestis et al. (1976)</td>
<td>49/F*</td>
<td>lt parasagittal</td>
<td>meningothelial</td>
</tr>
<tr>
<td>Walsh et al. (1977)</td>
<td>69/M**</td>
<td>rt convexity</td>
<td>meningothelial</td>
</tr>
<tr>
<td>Sakai et al. (1981)</td>
<td>39/M</td>
<td>rt sphenoid ridge</td>
<td>sarcomatos</td>
</tr>
<tr>
<td>Baskinis et al. (1984)</td>
<td>68/M</td>
<td>rt convexity</td>
<td>angiomatous</td>
</tr>
<tr>
<td>Tomita et al. (1985)</td>
<td>61/F</td>
<td>rt convexity</td>
<td>meningothelial</td>
</tr>
<tr>
<td>Wang et al. (1985)</td>
<td>62/F</td>
<td>rt convexity</td>
<td>not given</td>
</tr>
<tr>
<td>Kotwica and Zawirski (1986)</td>
<td>32/M</td>
<td>rt convexity</td>
<td>angioelastic</td>
</tr>
<tr>
<td>Itoyama et al. (1987)</td>
<td>73/F</td>
<td>lt sphenoid ridge</td>
<td>transitional</td>
</tr>
<tr>
<td>Present case</td>
<td>47/F</td>
<td>rt convexity</td>
<td>meningothelial</td>
</tr>
</tbody>
</table>

*Case 2 and **Case 4 of Modestis et al. (12)*

several mechanisms: 1) bleeding from the tumor itself, which may contain thin-walled vessels, 2,4,6,9 2) vessels stretched by tumor expansion are more susceptible to rupture, 3) bleeding from an abnormal vessel accompanying the meningioma, 4) exudation of fluid from the tumor vessels into the hematoma cavity, 5) and 5) “neomembrane formation,” similar to that of chronic subdural hematoma, caused by a reaction of the dura to the tumor. Although no abnormal vessels were verified within or around the tumor in our patient, we speculate that recurrent bleeding from the tumor could have produced the chronic subdural hematoma, based on the histological findings of hemosiderin deposition in the tumor involving hemangiopericytic components.

The small cluster of meningothelial cells within the outer membrane of a hematoma demonstrated in our case is very unusual. Walsh et al. 10 reported a similar finding, although it was uncertain whether the cells in the cluster were actually from the meningioma. McKenzie et al. 11 reported a metastatic brain tumor associated with chronic subdural hematoma, which contained a nest of malignant cells within the hematoma capsule. In the setting of systemic cancer, the chronic subdural hematoma membrane is a potential site for deposition of malignant cells because it contains a rich vascular capillary bed. Such a cluster of meningothelial cells might result from invasion of the tumor or entrapment of the tumor by the hematoma capsule, although the latter is more likely. Nevertheless, such meningothelial cell clusters, as well as the meningioma, may promote or contribute to hematoma formation by one or more of the numerous mechanisms discussed, but confirmation awaits the investigation of additional cases.

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References

Meningioma with Chronic Subdural Hematoma


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