Anaplastic Astrocytoma with Extracranial Extension

—Case Report—

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Abstract

A 44-year-old female presented with anaplastic astrocytoma of the right temporal lobe which had destroyed the skull base and extended extracranially. Histologically, the extracranial portion of the tumor was astrocytoma with desmoplastic reaction. She was treated by subtotal tumor removal, radiation therapy, and chemotherapy, but died of meningeal dissemination. Spontaneous extradural extension of malignant glioma is rare and always fatal.

Key words: desmoplasia, glioma, extracranial extension

Introduction

Neuroepithelial tumors rarely invade the dura mater, even if located proximally. Extension to the extracranial mesodermal tissues through the dura and cranium is extremely rare.

We report a patient with an anaplastic astrocytoma extending extradurally.

Case Report

A 44-year-old female had a history of mild headache beginning at the end of 1990. Early in July, 1991, she suffered severe headache and noticed a soft mass on the right cheek. One week later, right exophthalmos and hypesthesia of the right face developed, which worsened daily. She was admitted to our hospital on July 29, 1991.

Physical examination revealed a soft mass 3 cm in diameter on the right zygomatic region and mild exophthalmos of the right eye. Neurological examination showed hypesthesia of the right face.

Computed tomographic (CT) scans revealed an enhanced mass in the right temporal region, with marked extension to the pterygopalatine fossa through the destroyed middle cranial base (Fig. 1). Magnetic resonance (MR) images demonstrated the mass extending to the pterygopalatine fossa more clearly (Fig. 2).

The elastic hard, light gray, meningioma-like extradural tumor continuing to the thickened dura mater was removed subtotally on August 6. Temporal lobectomy including the intramedullary soft tumor was also performed. The portions of the tumor could be dissected from each other quite easily.

The histological appearance of the intradural portion of the tumor indicated anaplastic astrocytoma...
(Fig. 3A). The extradural portion of the tumor had the same general appearance as the intradural portion, but the tumor cells were spindle shaped with stream-like and whorled patterns in a reticulin-rich stroma, suggesting anaplastic astrocytoma with desmoplastic reaction (Fig. 3B, E). Both portions of the tumor stained positively for glial fibrillary acidic protein (GFAP) (Fig. 3C, D).

Despite radiation therapy and chemotherapy with intravenous 1-(4-amino-2-methyl-5-pyrimidinyl)methyl-3-(2-chloroethyl)-3-nitrosourea hydrochloride, she developed mental disturbance, loss of visual acuity, and tetraplegia late in November. MR images showed meningeal dissemination forming multiple masses in the cervical subarachnoid space (Fig. 4). Her neurological status grew worse, she became completely tetraplegic and required controlled
respiration. Her general condition continued to deteriorate and she died on January 11, 1992, about 5 months after surgery.

Discussion

Extracranial extension of glioma is rare. After surgery, distant metastasis and continuous extension through the dura mater may occur.2,5,6 Glioma occasionally invades the dura mater, but mostly only the inner layer of the dura.1,5 Table 1 lists the seven reported cases of glioma, including ours, infiltrating the outer layer and destroying the skull without previous craniotomy.1,3,5,8-10 All cases were malignant gliomas (5 glioblastomas and 2 malignant astrocytomas), and occurred in relatively young patients (mean age, 45.7 yrs). The temporal lobe was the predominant tumor site (5 cases). Histologically, the extradural portion of the tumor showed desmoplastic reaction of the glioma in all but one case (Case 5, gemistocytic astrocytoma).

Kawano et al.3 proposed three pathways for the transdural extension of glioma: through the perivascular or dural slit; direct destruction of the dura; and along the cranial or spinal nerves. Temporal gliomas, including ours, are thought to extend via the first pathway because there are numerous middle meningeal vessels in the temporal base.

When neuroectodermal tumors break through the arachnoid or the dura, reactive desmoplastic changes are produced by fibroblasts. This leads to proliferation of connective tissue, with the formation of variable amounts of reticulin and collagen.3,6,10 Because such tumors are hard, a misdiagnosis of meningioma is often made during operation.10 The prognosis for the patient is poor. Liwnics and Rubinstein4,7 suggested that the most frequent cause of death was distant metastasis due to direct access of the glioma to the extrameningeal tissue, not excluding hematogenic spreading. In our case, meningeal dissemination was the cause of death.

References


Table 1 Reported cases of glioma with extracranial extension

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Author (Year)</th>
<th>Age/ Sex</th>
<th>Location</th>
<th>Histology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sanerkin (1962)8</td>
<td>65/M</td>
<td>temporal</td>
<td>glioblastoma</td>
</tr>
<tr>
<td>2</td>
<td>Nager (1967)5</td>
<td>41/M</td>
<td>temporal</td>
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<tr>
<td>3</td>
<td>Silverberg and Hanbery (1971)9</td>
<td>25/M</td>
<td>temporal</td>
<td>glioblastoma</td>
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<tr>
<td>4</td>
<td>Kawano et al. (1977)3</td>
<td>49/F</td>
<td>parietal</td>
<td>malignant astrocytoma</td>
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<tr>
<td>5</td>
<td>Aoyama et al. (1980)1</td>
<td>30/M</td>
<td>frontal</td>
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<tr>
<td>6</td>
<td>Tognetti et al. (1982)10</td>
<td>66/M</td>
<td>temporal</td>
<td>glioblastoma</td>
</tr>
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<td>7</td>
<td>Present case</td>
<td>44/F</td>
<td>temporal</td>
<td>malignant astrocytoma</td>
</tr>
</tbody>
</table>

Fig. 4 T1-weighted postcontrast MR image, showing diffuse subarachnoid enhancement and multiple enhanced masses in the cervical spinal canal.

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