Combination Chemotherapy with Cisplatin and Etoposide for Hematogenous Spinal Metastasis of Intracranial Germinoma

—Case Report—

Youichi ITOYAMA, Masato KOCHI, Shigeo YAMASHIRO, Kimio YOSHIZATO, Jun-ichi KURATSU and Yukitaka USHIO

Department of Neurosurgery, Kumamoto University Medical School, Kumamoto

Abstract

A 24-year-old male presented with a metastatic germinoma in the thoracic vertebra 7 years after irradiation of a pineal germinoma. Combination chemotherapy with cisplatin and etoposide was highly effective. No recurrence has appeared in the 2 years since chemotherapy.

Key words: intracranial germinoma, metastasis, cisplatin, etoposide

Introduction

The incidence of metastasis from germ cell tumors via shunt tubes to the intraperitoneal space is about 10%. Hematogenous systemic metastasis from germ cell tumors, mainly malignant nongerminomatous tumors, occurs in only 3% of cases, and metastasis from germinoma is even rarer, with only nine cases reported. Here, we describe a patient with a thoracic spinal metastatic germinoma occurring 7 years after irradiation of a pineal germinoma. The metastatic tumor was successfully treated with combination therapy of cisplatin and etoposide (PE therapy).

Case Report

The patient, then aged 17 years, was diagnosed as having a pineal germinoma in April, 1982. He received whole-head (10 Gy) and local irradiation (40 Gy) at another institute. The diagnosis was based on the effectiveness of the radiation therapy, and no biopsy was performed. No spinal irradiation was performed, and his post-treatment course was uneventful. In December, 1987, he presented with paraparesis of the lower extremities and dysfunction of the bladder and rectum. A metastatic tumor in the sacral region was removed at the orthopedic department of our institute. The main mass was located in the extradural space but the tumor was also present intradurally. The histological diagnosis was two-cell pattern germinoma. In February, 1988, he received irradiation to the whole spine (20 Gy) and local site (35 Gy). Computed tomographic (CT) scans disclosed a mass in the anterior horn of the lateral ventricle. Further irradiation to the whole head (30 Gy) and local site (15 Gy) was also given. His post-irradiation course was uneventful.

He was readmitted on December 21, 1989, aged 24 years, with back pain. On admission, neurological examination revealed only radiating back pain at the Th10 level. Magnetic resonance (MR) images disclosed a large extradural tumor in the vertebral body at the Th10 level, displacing the spinal cord to the opposite side (Fig. 1). Under the diagnosis of extraneural metastasis from germinoma, a course of PE therapy (cisplatin 20 mg/m^2 and etoposide 60 mg/m^2) was administered for 5 days starting on December 22. His back pain disappeared, and MR images on January 18, 1990 showed no residual tumor (Fig. 2). The spine was supported with a corset during the treatment. Three further 5-day courses of PE therapy were given starting on January 30, March 19, and August 27, 1990. Follow-up MR images have demonstrated no recurrence in the spine or brain for more than 2 years. No metastatic tu-
mors in other organs, including the lungs, have been noted. Tests for tumor markers were always negative. He is now working as a teacher at an elementary school.

**Discussion**

Fifty to sixty percent of intracranial germ cell tumors are germinomas. These tumors are highly radiosensitive, and respond well to radiation therapy. The 5-year survival rate of patients with germinomas is over 80%, although delayed effects cause some concern. However, about 11% of germinomas disseminate to the spinal subarachnoid spaces. There is no consensus on the efficacy of prophylactic irradiation to the spinal cord to prevent spinal subarachnoid dissemination, because spinal dissemination is rare. Aida et al. advocated prophylactic spinal irradiation only in special circumstances, for example double midline germinoma, spinal dissemination demonstrated by CT and/or MR imaging, or abnormal tumor cells discovered by cerebrospinal fluid examination.

Extraneural metastasis of intracranial neoplasms is rare, and the mechanism remains unclear. Surgical damage to the blood-brain barrier is one

---

**Table 1** Extraneural hematogenous metastasis of intracranial germinoma

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Author (Year)</th>
<th>Age/ Sex</th>
<th>Location</th>
<th>Direct operation</th>
<th>RT</th>
<th>Site of metastasis</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tompkins et al. (1950)</td>
<td>21/M</td>
<td>pineal</td>
<td>+</td>
<td>+</td>
<td>lungs, lymph nodes</td>
<td>died (1 yr 5 mos)</td>
</tr>
<tr>
<td>2</td>
<td>Borden et al. (1973)</td>
<td>9/M</td>
<td>pineal</td>
<td></td>
<td>+</td>
<td>lungs, lymph nodes, femur, cervical spine, musculature</td>
<td>alive (11 yrs)</td>
</tr>
<tr>
<td>3</td>
<td>Rubery and Wheeler (1980)</td>
<td>17/M</td>
<td>pineal</td>
<td></td>
<td>-</td>
<td>lumbar musculature, il loin, lymph nodes</td>
<td>died (4 yrs)</td>
</tr>
<tr>
<td>4</td>
<td>Motomochi et al. (1980)</td>
<td>29/M</td>
<td>suprasellar</td>
<td>+</td>
<td>-</td>
<td>lungs, bones, viscera</td>
<td>died (1 yr)</td>
</tr>
<tr>
<td>5</td>
<td>Galassi et al. (1984)</td>
<td>10/M</td>
<td>pineal</td>
<td></td>
<td>-</td>
<td>lungs, humerus, scapula</td>
<td>died (1 yr 8 mos)</td>
</tr>
<tr>
<td>6</td>
<td>Pena and Smith (1984)</td>
<td>37/M</td>
<td>pineal</td>
<td></td>
<td>-</td>
<td>parotid</td>
<td>died (1 mo)</td>
</tr>
<tr>
<td>7</td>
<td>Gay et al. (1985)</td>
<td>7/F</td>
<td>suprasellar</td>
<td>+</td>
<td>+</td>
<td>ilium, rib</td>
<td>alive (2 yrs 6 mos)</td>
</tr>
<tr>
<td>8</td>
<td>Balsitis et al. (1989)</td>
<td>52/F</td>
<td>suprasellar</td>
<td>+</td>
<td>+</td>
<td>humerus</td>
<td>died (9 mos)</td>
</tr>
<tr>
<td>9</td>
<td>Pallini et al. (1991)</td>
<td>15/M</td>
<td>pineal</td>
<td>+</td>
<td>+</td>
<td>femur</td>
<td>died (6 mos)</td>
</tr>
<tr>
<td>10</td>
<td>Present case</td>
<td>24/M</td>
<td>pineal</td>
<td></td>
<td>+</td>
<td>thoracic vertebra</td>
<td>alive (2 yrs)</td>
</tr>
</tbody>
</table>

RT: radiation therapy.

*Neurol Med Chir (Tokyo) 33, January, 1993*
possibility,4 and immunosuppression by repeated irradiation and/or extended administration of adrenocortical steroid hormone another.18) Glasauer and Yuhan3 reported that meningeal and glial tumors most frequently metastasize to the lung, and medulloblastomas to the bones. Motomochi et al.18 found that intracranial germ cell tumors metastasize to both lung and bone. Table 1 summarizes the 10 reported cases of extraneural hematogenous metastasis from germ cell tumors,1,4,6,7,18,20,21,23,25 including ours. In four cases metastasis was to the lung and in seven to bone.

The prognosis for patients with extraneural metastasis from malignant nongerminomatous germ cell tumors is poor. Watterson and Priest29 found that all 32 reported patients died, although their own patient survived. Repeated irradiation and chemotherapy with actinomycin D, cyclophosphamide, and methotrexate was effective in one patient with hematogenous metastases from pineal germinoma.4) Combination chemotherapy with cisplatin, vinblastine, and bleomycin has also been effective.7) Possibly, factors such as immunodeficiency adversely affect the prognosis for extraneural metastases of intracranial germinoma.

Combination chemotherapy consisting of cisplatin, vinblastine, and bleomycin is effective against intracranial germ cell tumors15,16 and extraneural metastases.7,19,22) Recently, PE therapy has been yet more effective due to the synergistic action.2,10,13) Our case demonstrates the effectiveness of PE therapy against metastatic vertebral germinoma. No renal failure or severe bone marrow suppression occurred, suggesting that the regimen used is effective and safe in patients with recurrent and metastatic germinomas.

References
shunt-related peritoneal deposits from a pineal germinoma. Case report and review of the literature. 


---

*Address reprint requests to: Y. Itoyama, M.D., Department of Neurosurgery, Kumamoto University Medical School, 1-1-1 Honjo, Kumamoto 860, Japan.*