Case Report

Late intrathoracic relapse of pineal germinoma connected to intraspinal canal

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Extraneural metastases of intracranial germinoma are rarely reported. The authors describe the first case of metastatic lung germinoma of the thoracic spine. A 27-year-old man presented with right shoulder pain and right upper limb weakness. He had a history of repetitive radiation therapy - nine (whole-abdomen; 15Gy), 12 (whole brain; 30Gy, whole spine 42Gy) and 14 years ago (local; 32Gy) - for abdominal metastasis, temporal and fourth ventricle metastasis and spinal dissemination and metastatic pineal germinoma, respectively. Magnetic resonance imaging revealed a lung mass invading the thoracic spine that was diagnosed as a germinoma by tumor biopsy. He was treated by irradiation with 54Gy and two cycles of chemotherapy with cisplatin and etoposide. He did not have any sign of tumor eight years later.

Key words: Extraneural metastasis, germinoma, lung, thoracic spine

Introduction

Intracranial germinomas are highly radiosensitive and the 10-year survival rates of patients following radiotherapy have been reported to be 79 to 100%. Although distant metastasis of intracranial germinoma is rare, metastases to bone, spinal epidural space and shunt-related peritoneal deposits from primary tumor were reported. These extraneural metastases of intracranial germinoma were controlled with adjuvant therapy. We describe a case of germinoma metastatic to the lung via thoracic spine and discuss the importance of long-term follow-up.

Case Report

First admission

In April 1983, a 13-year-old boy presented with a one-month history of double vision, headache, nausea and vomiting. Computed tomography (CT) revealed a calcified mass lesion in the pineal region with hydrocephalus [Figure 1]. Ventriculoperitoneal (VP) shunt was performed for hydrocephalus. Tumor cells were not detected in cerebrospinal fluid (CSF) cytology. After shunt operation, it was diagnosed as nonpathological germinoma following tumor ablation with a 20Gy irradiation. The patient was treated with local irradiation using a dose of 32Gy, in daily fractions of 200cGy. No tumor was visible on CT after irradiation. During the hospital stay, the beta-human chorionic gonadotropin (beta-HCG), alpha-fetoprotein (AFP), carcinoembryonic antigen (CEA) titers in serum or cerebrospinal fluid (CSF) were not measured.

Second admission

In April 1985, the patient presented with a two-month-history of both lower-limbs hypoaesthesia, absence of deep tendon reflex and left shoulder pain. Head CT revealed enhanced mass lesion in the left temporal and para-fourth ventricle [Figure 2]. Beta-HCG titer in serum was slightly elevated (2.2 ng/ml). The AFP and CEA titers

Figure 1: Plane head CT scan after VP shunt operation showing hyperdense mass lesion at the pineal region

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in serum were normal, although they were not tested in CSF. Tumor cells were not detected in CSF cytology. Spinal magnetic resonance imaging (MRI) was not investigated. However, it was suspected as recurrent intracranial and spinal cord germinoma with syncytiotrophoblastic giant cells (STGC) based on neurological findings, CT findings and elevation of beta-HCG titer. The patient was treated by whole-brain and whole-spine irradiation with 30Gy and 42Gy, respectively, in 150cGy daily fractions. When irradiation approached 15Gy the pineal region was protected. No tumor was visible on head CT and beta-HCG titers in serum were undetectable.

**Third admission**

In July 1988, the patient visited the hospital for a tender abdominal mass. Abdominal MRI revealed a huge tumor in the intraperitoneal space [Figure 3]. Beta-HCG titer in serum was slightly elevated at 4.8ng/ml, while AFP and CEA titer in serum were normal. It was diagnosed as metastasis of intracranial germinoma involving the VP shunt based on MRI finding and beta-HCG titer. The patient was treated by whole-abdomen irradiation with a total dose of 15Gy in 100cGy daily fractions and local irradiation with an additional 15Gy. No tumor was visible on abdominal CT and beta-HCG titer in serum was undetectable.

**Fourth admission**

In September 1997, the patient presented with a four-month-history of right shoulder pain, right upper limb dysesthesia and weakness. Chest MRI revealed a large right-sided intrathoracic mass lesion connected to the intraspinal canal lesion [Figure 4]. Beta-HCG titer in serum was slightly elevated (3.3 ng/ml). The AFP and CEA titers in serum were normal. Biopsy was performed for intrathoracic mass lesion and diagnosed as germinoma [Figure 5]. Immunohistochemical studies were performed and neoplastic cells were positive for placental alkaline phosphatase and negative for AFP, CEA and HCG. The

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**Image Descriptions:**

**Figure 2:** Left: Contrast-enhanced head CT scan showing a growing lesion at the para-fourth ventricle. Right: Contrast-enhanced head CT scan showing a growing lesion at the left medial temporal region.

**Figure 3:** Plane sagittal abdominal MRI showing a huge mass extending from the recto-uterine excavation. The intestine was lifted above the mass.

**Figure 4:** Plane axial chest MRI showing a right large intrathoracic mass lesion connected to an intraspinal canal lesion. The lesion infiltrates the mediastinum and a spinal vertebral body. Trachea is displaced with the mediastinum shifted to the left.

**Figure 5:** Light photomicrographs showing large round neoplastic cells with prominent nucleoli interspersed with lymphocytes. Pathological diagnosis was germinoma. H/E, original magnification 400x.
Some reports have demonstrated intraperitoneal metastasis through a VP-shunt,\(^5\) it was not recommend the operation of VP-shunt before the intracranial germinoma treatment.\(^4\) In fact, we should have treated the metastatic invasion in our case with chemotherapy or radiotherapy to follow the ventricular drainage temporally\(^6\) or third ventriculostomy\(^7\) for obstructive hydrocephalus.

Intracranial germinomas and germinomas with STGC recur in 10 to 17% of cases,\(^1,4\) within two years of the initial tumor, usually at nonirradiated sites.\(^4,8\) In the case of germinomas with STGC, some studies have reported tumor recurrence at the irradiated site.\(^6\) Control of the tumors outside the irradiated area is possible only with radiation therapy\(^9\) or a combination of radiation therapy and chemotherapy.\(^3\) In this case, we used irradiation even for those recurring nine years after treatment since tumor site is different each time. Recurrences more than five years later are extremely rare,\(^4,9,10\) and such cases often occur in the irradiated field. However, tumor control is not always possible even with additional irradiation in view of the brain damage.\(^5,0\) Therefore, it is important to aggressively treat the intracranial germinoma the first time. In addition, a long-term follow-up is necessary as germinomas can recur even 23 years after treatment.\(^10\)

The findings reveal that the mechanism of pulmonary metastasis of intracranial germinoma involves the spinal cord originating as a thoracic mass lesion. This explains the relationship between the tumors of the intraspinal canal and the intrapleural space [Figure 4] and is the first such case of a metastasis. Given the frequent occurrence of systemic failure after therapy, we believe a careful follow-up of extraneural metastases is essential.

**References**


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