Concurrent chemoradiotherapy for primary cervical spinal cord germinoma

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Abstract

We report a rare case of primary intramedullary germinoma in the cervical spine of a 39-year-old woman without evidence of intracranial or disseminated disease. The germinoma was treated by a biopsy and follow-up concurrent chemoradiotherapy. This is the only reported case of primary spinal cord germinoma for which concurrent chemoradiotherapy was given. Furthermore, this is only the second reported case of histologically documented primary intramedullary cervical spinal cord germinoma. The patient was disease-free and there was near-complete resolution of the pre-operative neurological deficits at the 20-month follow-up examination.
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1. Introduction

Among central nervous system (CNS) germinomas, primary intramedullary germinoma is extremely rare, particularly in the cervical spine. Only one case of primary cervical spinal cord germinoma with a confirmed pathological diagnosis has been reported.1 We report the second such case, which was successfully treated with concurrent chemoradiotherapy.

2. Case report

2.1. History

A 39-year-old woman suffered numbness in four limbs and intermittent neck pain for 7 months prior to admission. The patient visited the outpatient department at our hospital and was treated conservatively. During the 5 days before admission, the patient had noted paraesthesia and weakness in all four limbs as well as difficulty in voiding.

2.2. Examination

Physical examination revealed well-developed musculature. At hospital admission, the relevant neurological findings included motor weakness in all four limbs, a mild increase in deep tendon reflexes, a positive Babinski sign and a dulling of sensation below the C3–C4 level. MRI showed a heterogeneous intramedullary mass lesion and marked cord swelling in the cervical spine, extending from C2 to T1 (Fig. 1).

2.3. Operation

The patient underwent C2–T1 laminectomy for removal of the intramedullary tumor. After opening the dura, it was noted that the cord was swollen. Myelotomy was performed over the most swollen portion to biopsy the tumor. The tumor was partially removed for pathological study. A duraplasty procedure was performed using Neuropatch (B. Braun, Melsungen, Germany). The procedure was completed without incident.

2.4. Pathological examination

Microscopic examination of hematoxylin and eosin-stained sections revealed sheets of large tumor cells bearing vesicular nuclei and occasional prominent nucleoli in between vessels with lymphocytic infiltration (Fig. 2A). In sections stained for placental alkaline phosphatase, there was strongly positive cytoplasmic staining for tumor cells, while the vessels and lymphocytes were negative (Fig. 2B). The tumor was diagnosed conclusively as a germinoma.

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2.5. Post-operative course

The patient underwent a whole-body examination for pathological confirmation of germinoma. No primary source other than the spinal cord lesion was detected by chest to abdomen CT imaging and cranial MRI. The cerebrospinal fluid (CSF) was normal, except for an elevated $b$-human chorionic gonadotropin ($b$-HCG) value (365.6 mIU/mL) and total protein value (107 mg/dL). The CSF-HCG value was nearly 9-fold higher than the serum-HCG value (42.2 mIU/mL).

According to the protocol for treating intracranial germinomas at our hospital, concurrent chemoradiotherapy with cisplatin (150 mg, day 1) and etoposide (total 450 mg, days 1–3) was given from 19 August 2005 to 21 August 2005. Local irradiation (30.6 Gy in total) was administered as 1.8 Gy per day per fraction 5 days per week from 18 August 2005 to 9 September 2005. After chemoradiotherapy, the serum-HCG value decreased to a normal level (< 2.0 mIU/mL) and MRI demonstrated disappearance of the enhanced mass (Fig. 3) at the 16-month post-operative follow-up. There was near-complete resolution of the pre-operative neurological deficits 20 months after treatment.

3. Discussion

In the CNS germinomas are usually found intracranially in the pineal or suprasellar regions and, in rare cases, in the thalamus, basal ganglia and spinal cord. The spinal
cord is an extremely rare primary location for germinomas, but metastasis from the intracranial region has been reported extensively. Only 15 cases of primary spinal cord germinoma have been reported recently. Among the 15 cases reported, 10 were from Japan and 1 was from China. This likely reflects a higher frequency of primary spinal cord germinoma in East Asia than in the West. As with intracranial germinoma, this tumor tends to occur in younger individuals. Most of the reported cases involved the thoracic or thoracolumbar spine.

Intramedullary spinal cord germinoma has clinical and neuroradiological presentations similar to other types of tumors, including ependymoma, astrocytoma, oligodendroglioma or hemangioblastoma and in rare cases, metastatic tumor. Due to there being a wide range of prognoses and treatments for different types of tumor, differential diagnosis is essential. Diagnosis of primary spinal cord germinoma can be confirmed by histological examination and exclusion of other foci. In this case, the possibility of metastasis from the intracranial region was excluded by MRI, which revealed an intramedullary cervical spinal cord lesion extending from C2 to T1. The lesion was longer than any previously reported. Moreover, to our knowledge, this case is only the second report of primary intramedullary cervical spinal cord germinoma with a confirmed pathological diagnosis.

Among the 15 reported cases of spinal cord germinoma, 6 cases showed elevated levels of serum or CSF HCG. Our patient also had elevated CSF and serum \( \beta \)-HCG values. Some CNS germ cell tumors are known to produce HCG, especially \( \beta \)-HCG. Unlike other tumor markers, such as carcinoembryonic antigen and alphafetoprotein, HCG has been shown to be produced by syncytiotrophoblastic giant cells that are often present in germinoma tissue. The prognostic significance of the HCG level in CNS germinomas still remains controversial. Sawamura classified germinomas with an elevated level of serum \( \beta \)-HCG into an intermediate prognosis group with higher rates of recurrence than those of pure germinomas, whereas Ogino et al. reported that the serum HCG level does not influence patient prognosis when the tumor is treated with sufficient doses of radiation.

The effectiveness of radiation therapy and/or chemotherapy for intracranial germinoma has been extensively documented. Therefore, surgical intervention with a biopsy rather than radical resection, and then treatment with adjuvant therapy is recommended. A still-developing approach involves the use of pre-irradiation chemotherapy to reduce the dose of radiation therapy for intracranial germinoma. Buckner et al. reported that chemotherapy followed by localised 30 Gy irradiation for a complete regression after chemotherapy and 50 Gy irradiation for a partial regression after chemotherapy, achieved 100% relapse-free survival with a median follow-up period of 43 months in nine patients with pure or \( \beta \)-HCG-secreting germinomas. Spinal cord germinomas are believed to respond similarly to intracranial germinomas. However, evaluating the effect of chemotherapy on spinal cord germinomas is difficult because of the rarity of this condition. Various chemotherapeutic agents for use with spinal cord germinomas have been described in the literature. The six reported patients with follow-up periods ranging from 6 months to 5 years were all alive with no evidence of disease at the end of the follow-up period. In the present reported case, chemoradiotherapy
was administrated concurrently with cisplatin and etoposide to reduce the dose of radiation therapy and to avoid subsequent neurological sequelae. The neurological outcome demonstrated that concurrent chemoradiotherapy is safe and effective for the management of spinal cord germinoma.

4. Conclusion

To our knowledge, ours is the only reported case of primary spinal cord germinoma for which concurrent chemoradiotherapy was given. It is only the second reported instance of intramedullary germinoma in the cervical spine with a confirmed pathological diagnosis. Any available information in the differential diagnosis of primary intramedullary spinal cord tumors should be carefully considered, as treatment options and patient prognosis may differ markedly for different tumors.

References


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Thyroid carcinoma metastasis to the choroid plexus of the lateral ventricle

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Abstract

We present a rare case of a lateral ventricle choroid plexus metastasis arising from thyroid carcinoma in a 62-year-old man. The patient underwent subtotal excision of the intracranial tumour followed by total thyroidectomy with good outcome. We review previous reports of intracranial thyroid metastases and discuss the role of surgical resection, chemotherapy, whole brain radiotherapy and radio-active iodine in the literature due to small numbers of patients reported. We recommend surgical resection for single accessible lesions.

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