Germ Cell Tumor Arising in the Basal Ganglia in a Female
—Case Report—

Hiroshi KOBAYASHI, Hiromu YAMADA, Noboru SAKAI, Takashi ANDOH
and Jun SHINODA

Department of Neurosurgery, Gifu University School of Medicine, Gifu

Abstract

Germ cell tumors in the basal ganglia are very rare in females. The authors report the case of a 12-year-old girl with such a tumor in the left basal ganglia. The tumor was subtotally removed and responded well to irradiation.

Key words: germ cell tumor, basal ganglia, human chorionic gonadotropin

Introduction

Primary germ cell tumors arising in the basal ganglia are extremely rare in females; only one such case has been reported in the literature. We describe the case of a 12-year-old girl with germ cell tumor in the left basal ganglia and present the computed tomographic (CT) scans and magnetic resonance (MR) images of this tumor.

Case Report

A 12-year-old girl was admitted to our department on April 4, 1986. Starting in the summer of 1984, her school performance had been gradually declining and she had developed progressive right hemiparesis. Neurological examination on admission revealed mild right hemiparesis, a noticeable intellectual deficit, and psychomotor retardation. Physical examination revealed neither diabetes insipidus nor precocious puberty; she had not begun to menstruate.

A postcontrast CT scan disclosed a circumscribed, markedly enhanced, irregular, multicystic tumor in the left basal ganglia, extending into the thalamus (Fig. 1). MR images demonstrated a multicystic tumor, with individual cysts varying in intensity (Fig. 2). The serum concentration of human chorionic gonadotropin (HCG) was 100 mIU/mg (normal range, < 5.0 mIU/mg). The beta-subunit of HCG was not measured. Alpha-fetoprotein (AFP) and carcinoembryonic antigen (CEA) levels in serum were within the normal range.

On April 15, 1986, a reddish tumor having a poorly defined margin and containing multiple cysts was subtotally removed from the insula through the trans-Sylvian approach. The cysts contained 27 ml of...
a bloody fluid having the consistency of motor oil.

Histological examination of the specimens under light microscopy (HE staining) verified that it was a germinoma (Fig. 3 upper). Immunohistochemical analysis revealed the presence of placental alkaline phosphatase (PLAP), mainly in the cell membranes (Fig. 3 lower). However, the specimens were not HCG-positive. The concentrations of HCG, AFP, and CEA were 120,000 mIU/ml, <1.0 ng/ml, and 1.4 ng/ml, respectively, in the intratumoral cyst fluid aspirated at surgery.

Immediately after surgery, her right hemiparesis disappeared. She underwent postoperative cranial irradiation in a total dose of 43.4 Gy (local 32.4 Gy, whole brain 11 Gy). The effectiveness of the radiation therapy was confirmed by serial CT scans, which showed marked regression of the enhanced mass (Fig. 4). Simultaneously, the serum HCG concentration decreased to within the normal range. Three and one half years after surgery, she continues to do well, with no apparent neurological deficits or CT evidence of tumor recurrence.

**Discussion**

Germ-cell tumors arising from the basal ganglia have long been thought to be rare. Kobayashi et al. estimated their incidence at this location to be 10% of all intracranial germinomas. Also, an overwhelming male dominance has been noted in the 34 basal ganglia germ cell tumors so far reported.

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**Fig. 2** MR images obtained on admission, show the multicystic tumor exhibiting a variety of intensities. *left: T1-weighted image (2000/500 mvec), right: T2-weighted image (2000/120 msec).*

**Fig. 3** upper: Photomicrograph of a tumor specimen, showing it to be a germinoma with a "two-cell pattern." HE stain, ×720. *lower: Photomicrograph of a specimen prepared for immunohistochemical PLAP study, showing a positive reaction, mainly in the tumor cell membrane. Counterstained with hematoxylin, ×360.*

**Fig. 4** Postcontrast CT scan taken after irradiation, revealing marked regression of the enhanced mass seen on initial CT.
Only one reported case involved a female, a 15-year-old girl. Studies of CT scans indicate that a young germinoma initially appears as a small, homogeneously enhanced mass. As it develops, a spotty lucent area appears in the center of the tumor. It is believed that through repetition of this process, the tumor grows and becomes multicystic. In addition, germinomas may be prone to intratumoral hemorrhage and central necrosis. In our patient’s multicystic tumor, the cysts exhibited different intensities on MR imaging, which is suggestive of repeated intratumoral hemorrhage over a period of time and lends support to the above hypothesis.

A high concentration of HCG in serum and in intratumoral cyst fluid may reflect the presence of a choriocarcinoma component and/or syncytiotrophoblastic giant cells. In our case, such a tumor component was not observed on histological examination. However, because choriocarcinoma is a highly malignant form of germ cell tumor, long-term follow-up with serial CT scanning, MR imaging, and serum analysis for HCG is necessary.

Addendum

This case was partially described as “Case 2” in a previously published report, in which serum and intratumoral cyst fluid levels of PLAP are given in detail.

References


*Address reprint requests to*: H. Kobayashi, M.D., Department of Neurosurgery, Gifu University School of Medicine, 40 Tsukasa-machi, Gifu 500, Japan.