Second Tumor Occurrence Following GH Treatment in Children with Brain Tumors: A Report of Two Cases

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There is growing concern about the oncogenic potential of GH used therapeutically. Twenty-eight patients were treated with GH for GH deficiency after treatment for a brain tumor in our clinic between 1970 and 1995. Two of them developed a second tumor following GH therapy.

The first patient was operated on for a hypothalamic glioma (Fig. 1, left) and received local irradiation 61 Gy at the age of 6 years. The tumor shrank (Fig. 1, middle). She then received GH replacement therapy with other hormones between 1986 and May, 1988. In September, 1990 she was readmitted to our clinic because of increased intracranial pressure and right exophthalmos. A CT scan showed a large new tumor in the right subtemporal area extending to the orbita and temporal lobe (Fig. 1, right). $^{67}$Ga-

Fig. 1 Case 1. left; CT of the first admission showed a large hypothalamic tumor. middle; MRI after radiation therapy. The hypothalamic tumor markedly shrank. right; CT of the second admission showed a new tumor in the subtemporal area.

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Scintigram showed hot areas in the right subtentorial area and the left femur. A subtemporal tumor was partially removed and histologically diagnosed as a rhabdomyosarcoma. Even with systemic chemoradiotherapy, she died after 13 months. The autopsy finding in the femur was the same rhabdomyosarcoma, and the primary site was not clarified.

The second patient was diagnosed as having a suprasellar germinoma at the age of 9 years (Fig. 2, left). She was treated with radiation therapy, and the tumor completely disappeared. She received conventional hormone replacement therapy, and GH treatment was started at the age of 9 years. Nine years after the start of the GH therapy, a frontal meningothelial meningioma (Fig. 2, right) was removed from her forehead. Retrospectively, the new tumor was able to pointed out in MRI 2 years before the operation.

We consider that the incidence of second tumor occurrence is high, even though the second tumor may be radiation induced. Our two cases suggest that GH may have a promotinig effect on the radiation induced neoplasm, but further study is needed.