

A Case Report: Tumorectomy for Brain Metastasis of Hepatocellular Carcinoma

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Described here is a rare case of an operation for brain metastasis of hepatocellular carcinoma (HCC) after hepatectomy. We admitted a 45-year-old male patient complaining chiefly of a visual field disturbance and headaches. He had undergone a hepatectomy due to HCC one year prior to hospitalization. He was diagnosed with a brain metastasis with intratumoral hemorrhage. He underwent a tumorectomy and hemorrhage excision. After the surgery, his neurological symptoms improved, and he was temporarily rehabilitated. The decision to operate in this case could be questionable because the patient already had a pulmonary metastasis. Nevertheless, we concluded that local therapy for such a brain metastatic lesion would be effective in alleviating his discomforts and improving his quality of life as long as the primary lesion was under control.

Key words : Hepatocellular carcinoma (HCC), Brain metastasis, Intratumoral hemorrhage, Hepatectomy

INTRODUCTION

Recently the prognosis for HCC patients has improved due to efficient and frequent tests on high risk patients with ultrasonography, which can detect smaller HCC at an earlier stage, and also due to the development of various treatments. Consequently, the typical survival period of HCC patients is being extended. Along with that, distant metastases are getting more common in HCC patients. However the incidence of brain metastasis is very rare, and an operable case of brain metastasis is uncommon. We encountered a very rare case of brain metastasis of HCC where the patient was diagnosed with a homonymous hemianopsia and headache. He underwent a tumorectomy of the brain metastasis and hemorrhage excision of intracranial hemorrhage. His neurological symptoms improved, and his quality of life got better. We report this case and also review the relevant literature.

CASE

The patient was a 45-year-old male. He was hospitalized because of visual field disturbance and headache on Feb. 9, 1989. He had a medical history including an exploratory laparotomy and blood transfusion when he had an intraperitoneal hemorrhage caused by a traffic accident when he was 24 years old. After that, he was infected with the hepatitis C virus. In April 1986, though a hepatic tumor about 50mm in size was detected by ultrasonography, he had left it untreated for lack of alone symptoms. In December 1987, his hepatic tumor grew to about 110mm, and he was admitted to our hospital. He was diagnosed as having an extra-hepatic growth of HCC (S6 primary) which was detected by abdominal computed tomography (CT) (Fig. 1) and an angiography. He underwent a right lobectomy of the liver on Feb. 2, 1988. The histopathological diagnosis was HCC, Edmondson II. The clinical stage, based on the General Rule for Hepatocellular Carcinoma [13], was of a

massive type, T2(P-A), S2, P0, N0, Vp0, Vv0, M1(S1), Z1, TW+. The postoperative course was uneventful and he was discharged from the hospital. Nine months later, however, multiple metastatic lesions appeared in the lung (Fig. 2), but residual liver recurrence was not evident (Fig. 3). He was aware of frequent scraping in his motorcar only on the left side in the middle of January 1989.

On Feb. 9, 1989 he came to our hospital with a serious headache and nausea. A left homonymous hemianopsia and a hemorrhagic high density area in his right posterior lobe were recognized on cranial CT (Fig. 4). The diagnosis was a brain metastasis and intratumoral hemorrhage. On the MRI, the central part of the hemorrhagic area of the brain showed iso-intensity on T1-weighted



Fig. 1 Abdominal CT examination reveals an enhanced image of the giant hepatocellular carcinoma with necrosis inside (S6 primary).

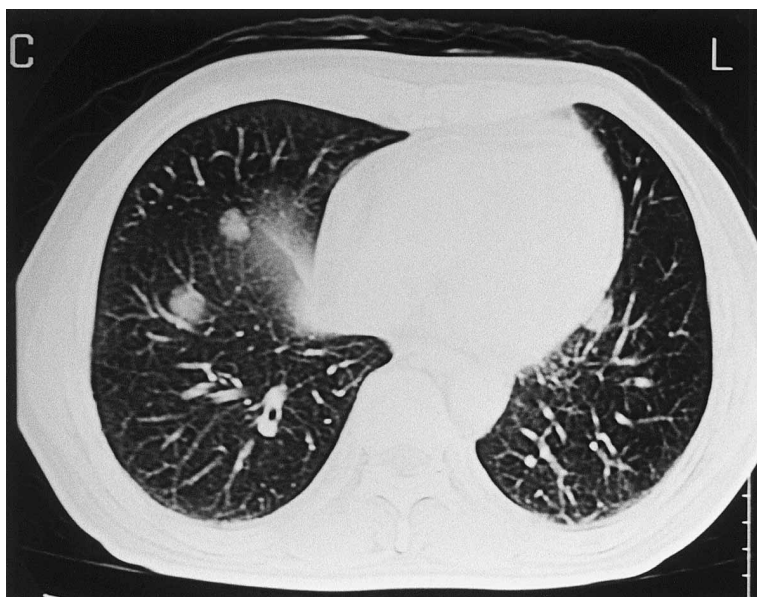


Fig. 2 The metastatic lesion in the lung is shown by chest CT.

image, and mottled low iso-intensity on T2-weighted image. On the other hand, the peripheral part of the hemorrhagic area showed high intensity on T1-weighted image and low intensity on T2-weighted image (Fig. 5, 6). By angiography on the right carotid, a hypervascular tumor being fed by his right angular artery was detected. He underwent an intracranial tumorectomy and hemor-

rhage excision on Feb. 21. The histopathological diagnosis was a brain metastatic lesion of HCC. He was discharged, since his left homonymous hemianopsia improved to quadrantanopsia. On July 1, 1989, however, he was re-admitted to our hospital because of his lower-right quadrantanopsia and headache. On July 13, he underwent a tumorectomy of the brain metastatic lesion

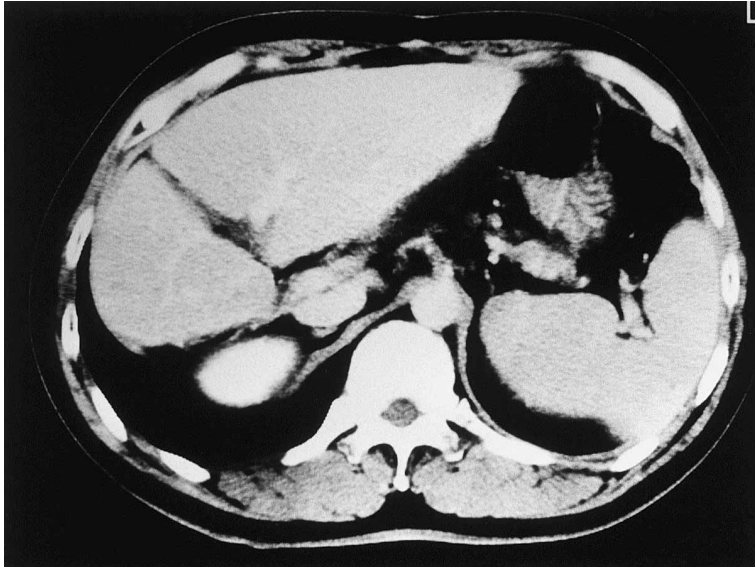


Fig. 3 Abdominal CT examination shows no sign of residual liver recurrence.

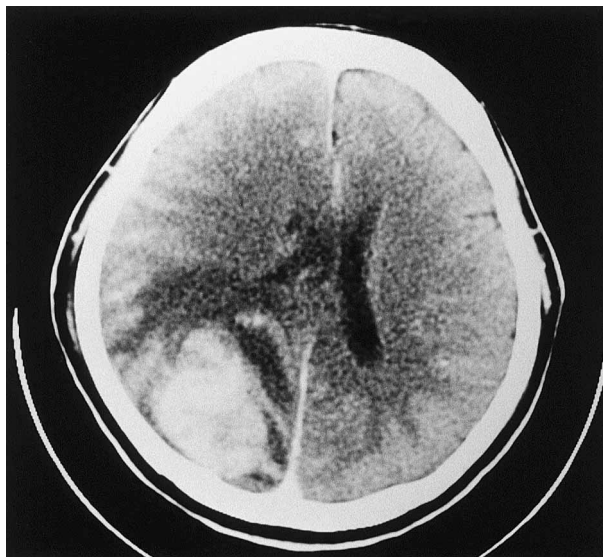


Fig. 4 The high-density area surrounded by low-density places in the right posterior lobe, shown by the cranial CT.

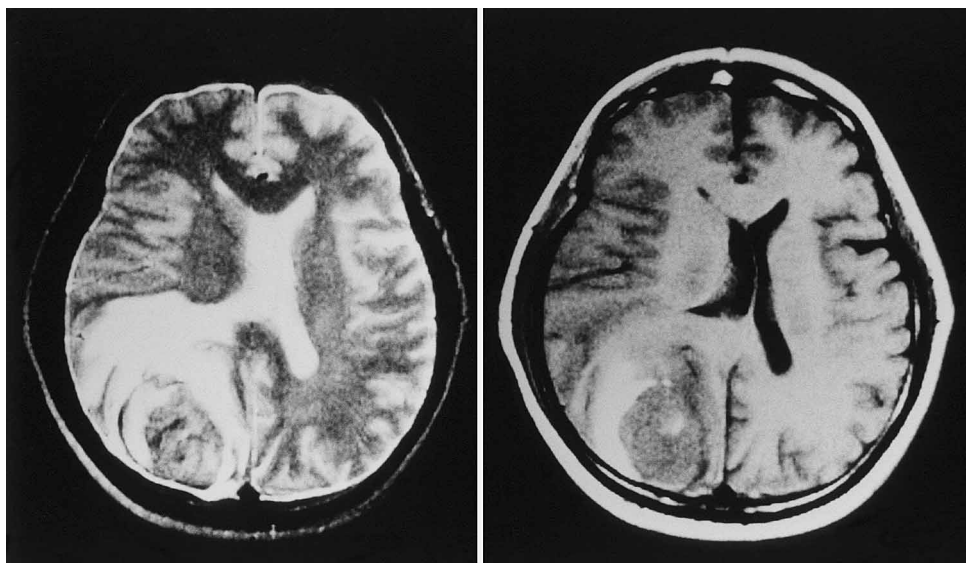


Fig. 5 & 6 On the MRI, the central part of the hemorrhagic area of the brain shows iso-intensity on T1-weighted image, and mottled low iso-intensity on T2-weighted image. On the other hand, the peripheral part of the hemorrhagic area shows high intensity on T1-weighted image and low-intensity on T2-weighted image.

on his left posterior lobe. On Oct. 4, hemorrhage caused by the gingival metastasis appeared in his mouth and then right hemiparesis progressed. Multiple metastasis and intratumoral hemorrhage on his left parietal lobe were recognized by cranial CT examination. He underwent a hemorrhage excision, but the pulmonary metastasis caused respiratory failure, of which the patient died on Nov. 7, 1989.

DISCUSSION

Hepatocellular carcinoma (HCC) is one of the most common cancers in Japan, and the metastasis of HCC is quite frequent. The metastatic rate of HCC is about 70%. HCC mainly metastasizes to the lungs as well as to the connected lymph nodes. Pulmonary metastasis is also frequent, with the metastatic rate of 40.1%. The metastatic rates to the other organs, according to autopsy reports in Japan, are as follows: lymph nodes 30%, peritoneum 12.9%, brain 0.5% [9]. The metastatic rate of the central nervous system is very low [7], though the metastatic lesion is mainly composed in the spine and the dura mater; hardly ever in the parenchyma [5]. The Liver Cancer Study Group of Japan reported the incidence of brain metastatic lesion from HCC is only 1.3% [12]. The

Brain Tumor Registry in Japan, for its part, reports that brain metastatic lesions of hepatic origin account for only 0.8% of all metastatic brain tumors [11]. The practice of operating on brain metastatic lesions is uncommon. Remote metastatic lesions from HCC are roughly divided into two categories: hematogenous metastasis and lymphogenous metastasis. The first type is generally more common than the other [2]. We assume that the route of the HCC to the brain is through the lungs and the circulatory system. The reasons why brain metastasis of HCC is rare can be summarized as follows [6]:

- 1) When it is characterized as a hematogenous metastasis, the HCC cells are easily captured in the lungs.
- 2) The prognosis for HCC patients is rather poor, and most die before the brain metastasis occurs.
- 3) In addition, there is little affinity between the HCC cells and the brain.

Recent progress has been made in various treatments as well as efforts to manage the condition, such as hepatectomy, transarterial embolization (TAE), percutaneous ethanol injection therapy (PEIT) and others [10]. These treatments have contributed to the

improvement in the prognosis for HCC patients. Thus, it is expected that the number of HCC patients with neurological symptoms under various treatments will increase. When neurological symptoms are manifested in an HCC patient, it is important to tell whether it takes the form of hepatic coma or hypertensive intracranial hemorrhage. As a brain metastatic lesion from HCC is hyper-vascular, it often causes an intratumoral hemorrhage, which is typically diagnosed as a stroke [15]. In our case, all the lesions were intratumoral hemorrhages. The cranial CT image revealed a ring enhancement of a nonhomogenous hematoma. In addition, the MRI image indicated that the nonhomogenous hematoma was of iso-intensity in its center and of high-intensity at its edges. Generally speaking, the characteristics of a metastatic brain tumor lesion are high-density areas on the plain CT image and a ring enhancement of the nonhomogenous hematoma at its edges on the enhanced image of the cranial CT [14, 15]. The T2-weighted MRI is supposed to be the most trustworthy method of detecting cerebral and cerebellar metastasis [4]. According to Atlas, et al. [3], tumoral hemorrhage presents irregular signaling and uneven deposition of hemosiderin on the MRI compared with a nontumoral hemorrhage. Also, the delayed signal changes and prolonged edema are characteristic of tumoral hemorrhage. These characteristics of tumoral hemorrhage are often used to distinguish tumoral hemorrhage from nontumoral hemorrhage. On the other hand, Murakami, et al. [8] has pointed out the possibility that the hypodensity rim is subject to the deposition of hemosiderin with a hemorrhage and the tumoral capsule. A metastatic brain tumor is one process of the systemic metastasis and is evaluated as stage 4. The goal of the therapy for metastatic brain tumor is at most symptomatic improvement. Thus, the course of therapy varies. In general, the operative indication for the metastatic brain tumor is as follows: 1) symptomatic, 2) solitary tumor, 3) operative site, 4) the primary lesion is cured or significantly long remission is expected. Asada et al. [1] having experienced 59 therapeutic cases of metastatic brain tumor, pursue the following therapeutic policy:

1) If more than two months' prognosis is

expected, even in the case of multiple tumors, an operation is called for.

2) Postoperative radiotherapy is practiced except for cases in which a solitary tumor is completely removed.

As long as the primary tumor is under control, local treatment on a metastatic lesion is effective for the long-term prognosis as well as for alleviating pain. When a remote metastatic lesion is recognized, it indicates that the primary HCC would have relapsed at a high rate. So the prognosis and the indication for treatment are subject to whether the HCC relapse is controllable or not. In the case of our patient, there was a pulmonary metastasis despite the absence of HCC relapse. The decision to operate was controversial, although in practice, the operation apparently improved the patient's neurological symptoms, and he survived for 5 months thereafter. The cranial enucleation of the HCC metastasis and/or intracranial hematoma cannot always guarantee extension of the patient's life, although the post-operative quality of the patient's life was surely enhanced in the present case. Therefore, we believe that the operation should be considered as one choice of treatment if the primary site of HCC is well controlled.

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