Metastatic Skull Tumor From Cholangiocarcinoma

—Case Report—

Junichi MIYAMOTO, Kazunori TATSUZAWA, Hiroyasu SASAJIMA, and Katsuyoshi MINEURA

Department of Neurosurgery, Kyoto Prefectural University of Medicine, Kyoto

Abstract

A 67-year-old female presented with a rare metastatic skull tumor from cholangiocarcinoma (CCC) manifesting as a progressive painful subcutaneous tumor. Computed tomography and magnetic resonance (MR) imaging revealed an osteolytic tumor attached to the sigmoid sinus and mastoid sinus. Mass reduction of the tumor was performed and radiotherapy applied to the postoperative cavity. The symptoms resolved following the surgical intervention. The skull metastasis from CCC appeared as heterogeneous intensity on MR imaging reflecting the honeycomb structure. Surgery should be considered to relieve symptoms and improve the patient’s quality of life, if there is a low risk of morbidity or mortality. The present case indicates another metastatic pathway through the vertebral plexus in the clinical course of CCC.

Key words: cholangiocarcinoma, skull metastasis, treatment

Introduction

Cholangiocarcinoma (CCC) is relatively rare, accounting for only 3% of all gastrointestinal cancers and 15% of liver cancers. The incidence of CCC is increasing worldwide, and the prognosis is unfavorable compared with that of hepatocellular carcinoma (HCC). Surgical resection is the only chance for cure, and the survival rate varies from 8% to 47%, with the highest survival in patients with tumor-free resection margins. The factors influencing survival with CCC after hepatectomy are tumor-free margin, absence of lymph node metastasis, and the histological findings of the tumor. The use of adjuvant chemotherapy and radiotherapy is controversial, and is generally considered ineffective with inoperable tumors. Therefore, the clinical course of CCC has yet to be adequately determined.

We describe a case of skull metastasis of CCC which was successfully treated by complete resection followed by radiotherapy.

Case Report

A 67-year-old female had undergone a hepatotomy on the right for intrahepatic CCC 2 years previously. She had received chemotherapy through an intraarterial reservoir for the residual tumor in the liver, which continued for 1 year, and also underwent radiotherapy (36 Gy) for a metastatic vertebral tumor at the 12th level 4 months prior to admission. She presented with a 6-month history of progressive subcutaneous tumor in her left occipital region. The lesion had become painful in the last month, which prompted her to visit our hospital.

Physical examination found a subcutaneous tumor measuring $8 \times 8$ cm, which was displacable and painful, but the scalp covering the mass was not reddish. Neurological examination revealed no abnormality. Blood analysis showed pancytopenia with white blood cell count of $3,200/{\text{mm}^3}$, red blood cell count of $2.95 \times 10^6/{\text{mm}^3}$, hemoglobin of 9.9 g/dl, and platelet count of 60,000/mm$^3$, resulting from the chemotherapy for the primary lesion, and elevation of inflammation markers.

Skull radiography and computed tomography showed an osteolytic tumor near the left petrous bone surface, which was attached to the mastoid sinus. Magnetic resonance (MR) imaging showed a heterointense tumor on both T1- and T2-weighted images, which was enhanced heterogeneously by gadolinium-diethylenetriaminepenta-acetic acid (Gd-DTPA). The tumor included a hyperintense area

Received June 19, 2006; Accepted November 20, 2006

Neurol Med Chir (Tokyo) 47, 132 ~ 135, 2007
Fig. 1 Computed tomography scan (left) showing an osteolytic tumor in the left occipital region. T1-weighted (center) and T2-weighted (right) magnetic resonance images showing a heterointense tumor containing an old hematoma.

Fig. 2 Photomicrograph showing ductal structures covered with atypical epithelium. Hematoxylin-eosin stain, ×100.

Metastatic Skull Tumor From CCC

on the T1-weighted image that suggested the presence of an old intratumoral hematoma (Fig. 1). Fluorine-18-2-fluorodeoxyglucose ([18F]FDG) positron emission tomography (PET) showed high uptake of [18F]FDG at the skull tumor but no uptake in other regions.

We suspected an intratumoral hemorrhage or infection from the left mastoid sinus, because of the pain and blood inflammation indicators, so we initiated antibiotic treatment. The pain improved 1 week after initiating the antibiotic treatment. After recovery of her bone marrow function, surgical intervention was performed for the occipital skull tumor. An inverted U-shaped skin incision in the occipital region revealed a clear boundary between the tumor and scalp. After dissection of the tumor from the scalp, a craniectomy was performed around the tumor region to expose the intact dural surface. The tumor had a honeycomb-like structure and contained an old hematoma. The tumor was completely removed from the dural surface. The petrous bone was distracted and the mastoid sinus was opened near the tumor. The area of the bony defect was then repaired using a titanium plate.

Histological examination indicated metastasis from CCC (Fig. 2). Postoperative MR imaging revealed a small intracranial metastasis in the left frontal lobe. The patient underwent stereotactic radiosurgery for the intracranial lesion, and focal radiation (30 Gy) for the postoperative cavity. The patient was discharged soon after the procedures with no deficits, and received chemotherapy for the primary lesion. Bone scintigraphy (technetium-99m hydroxymethylene diphosphonate, 555 MBq) identified metastases in the pubis and left scapula, but there was no recurrence of the skull tumor 6 months after the surgery.

Discussion

Previous cases of skull metastasis from liver cancer mostly originated from HCC.\(^1,5,6,8,11-17,19-21\) The rate of bone metastasis from HCC is 4.8–15.8%, with skull metastasis representing 0.5–6.1% of all bone metastases,\(^1\) although the incidence is increasing due to the prolonged survival after treatment for the primary lesion.\(^6\) En bloc removal of metastatic skull tumor with the attached dura is recommended,\(^1,10\) except for tumors at the skull base. Patients with skull metastasis from HCC are characterized by higher age, shorter duration of symptoms, and lower frequency of neurological deficit, compared to primary skull tumors and benign tumor-like lesions.\(^17\)

Most metastatic skull tumors are asymptomatic, but can cause severe disability due to compression of the dural sinuses\(^10\) or disturbance of the cranial nerve at the skull base.\(^20\) Bleeding from a skull tumor can cause epidural hematoma,\(^5,12,13\) and intratumoral hemorrhage can result in progressive enlargement of the tumor.\(^17\) The present patient suffered pain due to intratumoral hemorrhage or inflammation from the mastoid sinus, but antibiotics relieved the pain and eliminated the inflammatory indicators in the blood.

Skull tumors have been identified prior to the primary lesion, and 83% of cases of HCC skull metastasis involved a single lesion.\(^11\) Skull metastasis was found as the first evidence of disseminated disease in five of 12 cases.\(^16\) Skull metastasis from HCC has been reported without lung metastasis, as in the present case.\(^17,20\) The metastatic pathway may pass through the vertebral venous plexus rather than the pulmonary circulation.\(^4,18\) In the present case, vertebral and skull metastases were found prior to the lung metastasis, which indicated that the metastatic pathway involved the vertebral venous plexus.

MR imaging typically shows HCC as isointense on
FDG PET detects CCC as increased uptake. Such findings are atypical of HCC and typical of similar to the macroscopic honeycomb appearance.

Transarterial embolization before the surgery has been used in some patients with skull metastasis from HCC to prevent bleeding. However, the outcome for patients with CCC may not be satisfactory because of the malignant nature of the primary sources, even if the tumor is successfully treated. Postoperative radiotherapy was applied to the whole brain in some cases and only to the local lesion in others. In any case, local and general complications associated with the spread of this disease can be avoided.

In the present case, the skull metastasis from CCC had a heterogeneous appearance on MR imaging reflecting the honeycomb structure. Intratumoral bleeding caused enlargement of the tumor. Surgery and radiotherapy for CCC cannot affect the underlying disease, but radical excision is possible except at the skull base. Therefore, surgery must be considered to relieve pain, remove subcutaneous tumor, or prevent bleeding, if the risks of morbidity and mortality are low. Radiotherapy and radiosurgery were also effective in controlling the skull tumor in the present case. The present case of CCC also suggests that the metastatic pathway involved the paravertebral plexus.

Acknowledgments

The authors gratefully acknowledge the staff of the Cyclotron Unit, Nishijin Hospital, Kyoto, Japan for their cooperation.

References

18) Stark AM, Eichmann T, Mehdorn HM: Skull metastases: clinical features, differential diagnosis,
Metastatic Skull Tumor From CCC


Address reprint requests to: Junichi Miyamoto, M.D., Department of Neurosurgery, Kyoto Prefectural University of Medicine, 465 Hirokoji, Kawara-machi, Kamigyo-ku, Kyoto 602–8566, Japan.
e-mail: miyapoo850@yahoo.co.jp