Choroid Plexus Metastasis from Gastric Cancer

—Case Report—

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Abstract

A 64-year-old male presented with a unique choroid plexus metastasis from gastric cancer. Computed tomography and magnetic resonance imaging demonstrated a moderately enhanced mass in the lateral ventricle. The tumor was totally removed and histological examination revealed adenocarcinoma. Systemic investigation revealed gastric cancer. The differential diagnosis for intraventricular masses should include the possibility of metastasis from unidentified primary lesions.

Key words: choroid plexus, brain metastasis, gastric cancer

Introduction

Intraventricular masses are easily detected with cranial computed tomography (CT), but differential diagnosis by neuroradiological findings alone is difficult. Such masses are frequently primary intraventricular tumors including ependymoma, choroid plexus papilloma, meningioma, germinoma, astrocytoma, medulloblastoma, subependymoma, etc.,^{9,10,16)} while metastatic tumors are extremely rare. The most frequent primary malignancy causing brain metastasis is lung cancer, followed by breast cancer.^{2,6)} Brain metastases from gastric cancer are unusual, because the liver and lung act as barriers to hematogenous spread of gastric cancer to the central nervous system. Accordingly, metastatic lesions located elsewhere have usually been found before the brain metastasis manifests. The most common metastatic form of gastric cancer is meningeal carcinomatosis,^{3,11)} while isolated metastasis to the encephalic parenchyma is rare.

We describe a 64-year-old male with a solitary choroid plexus metastasis originating from asymptomatic gastric adenocarcinoma.

Case Report

A 64-year-old male was admitted to our hospital on

January 7, 1992, complaining of loss of consciousness lasting about 10 minutes. He had slight appetite loss, and disorientation and memory disturbance had gradually progressed over the past year. There was no other gastrointestinal symptoms. Neurological examination on admission showed moderate dementia, but no other neurological findings. Laboratory examination on admission showed only mild anemia. He had undergone ventriculoperitoneal shunt 12 years earlier because of hydrocephalus following subarachnoid hemorrhage of unknown origin.

Precontrast CT scans revealed a well-defined heterogeneous mass in the lateral ventricle including a high-density area suggestive of intratumoral hemorrhage. Postcontrast CT scans showed moderate enhancement of the mass (Fig. 1). No other intracranial mass was seen. T₁-weighted magnetic resonance (MR) images demonstrated a low-intensity mass with an iso-intense area in the center of the mass. T₂-weighted images showed a high-intensity lesion with an iso-intense area in the center. Gadolinium-diethylenetriaminepenta-acetic acid (Gd-DTPA) contrast agent caused marked uniform contrast enhancement (Fig. 2). Carotid angiograms showed no tumor staining. Whole body scintigraphy with ⁶⁷Ga detected no abnormal uptake area.

Under a diagnosis of choroid plexus papilloma, the tumor was totally removed *via* the anterior interhemispheric transcallosal approach 13 days after

Fig. 1 Cranial CT scans on admission. *upper*: Precontrast scans, showing a heterogeneous mass in the lateral ventricle. *lower*: Postcontrast scans, showing moderate enhancement of the mass.

admission. The dark-yellowish tumor was attached to the choroid plexus of the left lateral ventricle and had invaded the septum pellucidum. Histological examination of the tumor showed highly differentiated adenocarcinoma (Fig. 3). Periodic acid-Shiff (PAS) stain demonstrated PAS-positive substance in the tumor cells. Electron microscopy also revealed the characteristics of adenocarcinoma (Fig. 4).

Postoperatively, a further investigation to identify the primary lesion was performed. Blood chemistry tests showed a marked increase in CA19-9 (carbohydrate antigen) and slight increase in carcinoembryonic antigen levels. Upper gastrointestinal evaluation revealed the presence of a gastric mass, which endoscopic biopsy demonstrated to be an adenocarcinoma. No other metastatic lesion was found. He died of respiratory complication on March 21, 1992. No autopsy was performed.

Discussion

A large series of postmortem examinations showed that the incidence of metastasis to the choroid plexus was 2.6%,¹³⁾ and the most frequent origin was lung carcinoma. However, in most cases the choroid

Fig. 2 MR images 1 day after admission. *upper left*: T₁-weighted image, showing a low-intensity mass with an iso-intense area in the center of the mass. *upper right*: T₂-weighted image, showing a high-intensity mass with an iso-intense area. *lower*: T₁-weighted images after Gd-DTPA infusion, showing a markedly enhanced mass attached to the choroid plexus of the left lateral ventricle.

Fig. 3 Micrograph of surgical specimen, demonstrating highly differentiated adenocarcinoma. HE stain, $\times 200$.

plexus metastatic lesions were one of multiple systemic metastatic lesions. Solitary metastasis to the choroid plexus, detected clinically during life and confirmed by histological examination, is extremely

Fig. 4 Electron micrograph, showing finger-shaped microvilli with filamentous core rootlets and glycocalyceal bodies. Bar = 0.1 μ m.

rare with only five previously reported cases.^{4,5,8,14,15)} In these cases, the primary lesions were lung cancer or renal cell carcinoma. Our patient is the first with solitary metastasis from gastric cancer to the choroid plexus to be described. The intratumoral hemorrhage is also the first reported. Table 1 summarizes the clinical features of the six patients with choroid plexus metastases including ours. Generally, 1) the patients were elderly, 2) the primary malignancy was diagnosed before the symptoms of the brain metastasis appeared (in 4 cases),^{4,5,8,14)} 3) the metastatic lesion was located in the lateral ventricle, and 4) masses appeared as an iso- or high-density area with homogeneous enhancement on CT scans. However,

these characteristics are not sufficient to distinguish metastatic tumors from primary brain tumors.

The combination of MR imaging, CT, and angiography cannot achieve the differential diagnosis of intraventricular tumors, so histological examination is essential for the final diagnosis. In our patient, no clear symptoms other than neurological ones were present, so the preoperative diagnosis was primary intraventricular tumor. We obtained the definite diagnosis by histological examination.

Metastases to the brain are principally hematogenous.^{7,12)} The neoplastic cells gain access to the circulation by direct or lymphatic invasion. The vertebral venous system is another, rare, route of brain metastasis.¹⁾ This route may be important for metastasis to the cerebellum. In two previously reported cases of choroid plexus metastases, hematogenous metastasis was supposed.^{8,14)} In our patient, the metastatic site was supratentorial and no vertebral bone metastasis was observed, so hematogenous metastasis was suspected. How a solitary choroid plexus metastasis from gastric cancer occurred, overcoming the filtering effect of lung and liver, is unknown.

A moderately to markedly enhanced intraventricular mass on cranial CT scans requires that metastatic tumors be included in the differential diagnosis.

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Table 1 Summary of six cases of choroid plexus metastasis

Case No.	Author (Year)	Age/Sex	Primary lesion	Location of tumor	Pre-/postcontrast CT findings
1	Healy and Rosenkrantz (1980) ⁴⁾	73/F	lung	bil trigones	iso-density/homogeneous CE
2	Kart <i>et al.</i> (1986) ⁵⁾	61/M	lung	lt trigone	iso-density/homogeneous CE
3	Shigemori <i>et al.</i> (1987) ¹⁴⁾	58/M	kidney	body of rt lateral ventricle	high-density/homogeneous CE
4	Tanimoto <i>et al.</i> (1991) ¹⁵⁾	64/M	lung	rt trigone	iso-density/homogeneous CE
5	Mizuno <i>et al.</i> (1992) ⁸⁾	59/F	kidney	body of lt lateral ventricle	high-density/homogeneous CE
6	Present case	64/M	stomach	body of lt lateral ventricle	iso- to high-density/homogeneous CE (intratumoral hemorrhage)

CE: contrast enhancement.

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