Calcified Intracranial Metastatic Tumor Mimicking Meningioma

—Case Report—

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Abstract

A 60-year-old female presented with mild cerebellar dysfunction due to a calcified tumor attached to the undersurface of the tentorium cerebelli demonstrated by cranial computed tomography, and a lung mass on a chest x-ray film. The calcified nature and location made preoperative differentiation between metastatic brain tumor and meningioma difficult. Operation subsequently revealed that the brain tumor was a metastasis from lung adenocarcinoma. Metastatic brain tumors can be calcified, and should be considered in the differential diagnosis of calcified intracranial lesions.

Key words: metastatic brain tumor, meningioma, calcification, computed tomography

Introduction

Calcification inside an intracranial mass lesion is generally a reliable sign of slow growth or benign nature. The commonest such lesions are gliomas, meningiomas, aneurysms, angiomas, and granulomatous lesions. Computed tomography (CT) is more sensitive than conventional radiography for detecting calcified lesions, because of the superior contrast resolution. However, high-density areas on CT scans may represent intratumoral hemorrhage or mucoid degeneration, rather than calcification,^{8,11)} so differential diagnosis is important. Metastatic brain tumors rarely demonstrate calcification on plain skull x-ray films or even on CT scans. We recently encountered a patient with a calcified infratentorial tumor visible on CT scans, which was subsequently shown to be metastatic bronchial adenocarcinoma.

Case Report

A 60-year-old female was admitted to our hospital on March 2, 1992, with a 2-month history of unsteady gait. She had undergone a hysterectomy in 1972, for myoma of the uterus. She denied ciga-

rette smoking, tuberculosis exposure, or unusual infections. She was alert, cooperative, and oriented. All vital signs and general examination were normal. Neurological examination revealed no abnormalities except for mild cerebellar dysfunction. The routine laboratory examinations were normal.

Skull x-ray films detected no abnormalities. CT scans demonstrated a partially calcified lesion attached to the inferior surface of the tentorium, enhanced homogeneously postcontrast in the non-calcified portion (Fig. 1). Magnetic resonance (MR) images confirmed these findings (Fig. 2). Carotid and vertebral angiograms revealed only an avascular mass. Routine chest x-ray films on admission showed a 5-cm round mass in the left middle lung field. Chest CT scans revealed that the mass was partially calcified. Bronchoscopy with biopsy confirmed the diagnosis of poorly differentiated adenocarcinoma of the lung. The differential diagnosis of the brain lesion included tentorial meningioma and calcified metastatic tumor from the lung carcinoma. The risk of tonsillar herniation, especially due to dyspnea after thoracotomy, required that the brain tumor should be removed before the lung cancer.

A left suboccipital craniectomy was performed through a paramedian longitudinal skin incision. The tumor was hard and grayish white, and loosely attached to the undersurface of the tentorium, with

Fig. 1 *left*: Precontrast CT scan, demonstrating an irregular high-density area with perifocal edema in the left cerebellar hemisphere. The mass compressed and displaced the fourth ventricle to the opposite side. *right*: Postcontrast CT scan, showing the homogeneously enhanced mass.

Fig. 3 Photomicrograph of the surgical specimen, showing adenocarcinoma with papillary arrangement of the tumor cells, consistent with a metastasis derived from lung adenocarcinoma. HE stain, $\times 25$.

Fig. 2 *left*: Precontrast MR image, disclosing a low-intensity lesion in the left cerebellar hemisphere. *right*: Postcontrast MR image, showing the homogeneously enhanced mass attached to the undersurface of the tentorium cerebelli.

a clear plane of dissection allowing total removal of the tumor.

Histological examination of the surgical specimens revealed an adenocarcinoma composed of cells in a papillary arrangement, with multiple psammomatous calcifications within the stroma. The appearance was consistent with metastasis from lung adenocarcinoma (Fig. 3).

The postoperative course was uneventful, and the cerebellar dysfunction resolved within 1 week. A total of 54.2-Gy whole and local brain irradiation was given. On May 28, 1992, she underwent a left

thoracotomy and upper lobectomy for the lung carcinoma. She also received chemotherapy using carboplatin and etoposide. She was discharged with normal neurological findings on June 22, 1992. Eight months later, she remained in a satisfactory condition.

Discussion

Calcification of metastatic brain tumors is believed to be rare. Excluding sarcomatous tumors, such as osteosarcoma or chondrosarcoma, only about 25 cases of calcified intracranial metastatic carcinoma are known.^{1-7,9,10,12-15} The patients were aged from 32 to 69 years (mean 55.9 yrs). The most common primary sites for calcified intracranial metastatic carcinoma were breast (7 cases), lung (5), and colon (4). The metastatic brain lesion was solitary in 16 cases (64%) and multiple in nine (36%). The interval between treatment of the primary cancer and onset of the metastatic brain lesion ranged from 6 months to 10 years. Two patients, like ours, initially presented with the signs and symptoms of the intracranial metastatic lesions. The survival period after manifestation of the metastatic brain tumor was 1-18 months.

We suspected lung carcinoma in our patient based on the findings of the routine chest x-ray film, which was confirmed by bronchoscopy with biopsy. Despite the presence of the malignant lung neoplasm, the possibility of two separate tumors, lung adenocarcinoma and intracranial meningioma, could not be excluded from the differential diagnosis. The fact that the tumor was calcified and

relatively large without causing severe symptoms suggested a long-standing process. The location in the posterior fossa, attached to the undersurface of the tentorium cerebelli, is one of the preferential sites of meningiomas. Generally, the differential diagnosis between metastatic brain tumors and benign intracranial neoplasms, including meningioma, is exceedingly important, especially for planning the treatment. The brain tumor in our case was possibly a metastasis from the lung carcinoma, so surgical removal was indicated because of the solitary and symptomatic nature, absence of other metastases, and the potential to become life-threatening in the near future. A suspected tentorial meningioma would have made the indications for surgery less clear.

Recently, Khanjanasthiti and Issaragrisil⁸⁾ found seven of 121 metastatic brain tumors included calcification, while Anand and Potts¹⁾ observed seven cases of calcified brain metastases during a period of only 8 months. The wider use of routine CT may identify calcification within metastatic brain tumors more frequently in the future. Therefore, brain metastases should be included in the differential diagnosis of calcified intracranial lesions, especially if the diagnosis of meningioma indicates postponed surgical treatment.

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