Asian Journal of Surgery (2014) 37, 162–166

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.e-asianjournalsurgery.com

CASE REPORT

High-grade glioma in a patient with breast cancer

Che-Chao Chang [a], Chih-Hao Tien [a], Shih-Huang Tai [a], Ming-Tsung Chuang [b], Chun-I Sze [c], Yu-Chang Hung [a], E-Jian Lee [a,*]

[a] *Neurosurgical Service, Department of Surgery, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan*
[b] *Department of Diagnostic Radiology, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan*
[c] *Department of Pathology and Cell Biology and Anatomy, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan*

Received 30 January 2012; received in revised form 17 May 2012; accepted 31 May 2012
Available online 10 July 2012

KEYWORDS
anaplastic oligodendroglioma;
breast cancer;
high-grade glioma;
metastatic brain lesions

Summary Breast cancer is one of the most common origins of metastatic lesions in the central nervous system. Many patients with a breast cancer and concurrent brain tumor(s) were diagnosed to have a metastatic lesion or lesions in the brain, based exclusively on their image findings without further pathologic verification, and received radiotherapy alone thereafter. It is, however, possible that a different pathology such as primary brain malignancy, which actually warrants a specific treatment modality, may occur in such patients with an already known malignancy. We, herein, reported a 61-year-old female patient who suffered from an anaplastic oligodendroglioma 1 year after her diagnosis of breast cancer. Demographic data, characteristic imaging findings, treatment, and outcome of the patient were discussed.

1. Introduction

Breast cancer is one of the most common origins of the metastatic lesions in the central nervous system (CNS). As estimated, approximately 10–15% of breast cancer patients suffer from the CNS metastatic lesion(s) throughout the course of treatment.[1] Many patients with a breast cancer

Conflicts of interest: The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

* Corresponding author. Department of Surgery, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, 138 Sheng-Li Road, Tainan 70428, Taiwan.
E-mail address: ejian@mail.ncku.edu.tw (E-J. Lee).

1015-9584/$36
http://dx.doi.org/10.1016/j.asjsur.2012.06.007

and concurrent brain tumor(s), however, do not receive a surgical extirpation or biopsy for the CNS lesions, because characteristic radiological findings such as a ring-like enhancing lesion or multiple lesions with peritumoral edema in the computed tomography (CT) and magnetic resonance imaging (MRI) often have made a putative diagnosis of malignant metastatic lesion or lesions. These patients are often treated with whole-brain radiotherapy (WBRT) to the brain plus systemic chemotherapy for local tumoral control, because most patients with metastatic lesions, especially those with multiple small lesions (less than $2 \times 2 \times 2\,cm^3$) that originated from breast cancer, response well to the radiation treatment.[1,2] It is, however, possible that primary brain malignant gliomas, although relatively rare in incidence, may develop in patients with a systemic malignancy, and such patients actually need a treatment modality already developed and tailored for primary CNS malignancy.[3] We reported a female patient who suffered from an anaplastic oligodendroglioma 1 year apart after her diagnosis of breast cancer. Demographic data, characteristic imaging findings, tailored treatment, and final outcome of the patient were discussed.

2. Case report

A 61-year-old woman was diagnosed to have a right-sided invasive ductal carcinoma ($T_2N_2M_0$, stage IIIA) and left-sided ductal carcinoma *in situ* 1 year prior to her neurologic evaluation. She had no family history of breast cancer, and had undergone right-side modified radical mastectomy and left-side total mastectomy thereafter. The tumor was confirmed to be an adenocarcinoma that was strongly positive for estrogen and progesterone receptors but was negatively stained for human epidermal growth factor receptor-2 (HER2). The patient was further treated with local radiotherapy (50 Gy for right chest wall and 50 Gy for right supraclavicular lymph nodes) and chemotherapy with cyclophosphamide, doxorubicin, and paclitaxel, without notable adverse effects.

The patient experienced progressive recent and remote memory impairment and cognitive dysfunction 1 year after her diagnosis of breast cancer. She was also found to have mild weakness (motor grade = 4+/5) of the right upper and lower limbs. Cranial functions and other neurologic examinations were unremarkable. Further CT and MRI examinations of the brain demonstrated that the patient had multiple brain lesions, including a large ($4 \times 4 \times 5\,cm^3$ in size) brain tumor located at left parieto-occipital subcortical regions extending into the ipsilateral splenium of the corpus callosum, and two other small, but apart, lesions in the lateral ventricle wall and the parietal cortex of the ipsilateral brain (Fig. 1). The patient was diagnosed to have a multifoci primary brain malignancy rather than secondary metastases, because the largest brain lesion was relatively infiltrative and deeply invasive to the corpus callosum. She subsequently underwent a craniotomy for gross total resection of the largest brain lesion. Pathologic examination demonstrated the tumor to be an anaplastic oligodendroglioma with plenty of cells having hyperchromatic, pleomorphic nuclei and abundant pale eosinophilic cytoplasm, and with vascular proliferation (Fig. 2A). Further immunohistochemical examinations showed that the tumor was strongly positive for glial fibrillary acidic protein (GFAP) but was negative for cytokeratin staining (Fig. 2B and 2C). Moreover, the Ki-67 labeling index was found to be approximately 40% (Fig. 2D), indicating a relatively high mitotic activity. Furthermore, the methylation-sensitive polymerase chain reaction (PCR) of the tumoral tissues demonstrated the O_6-methylguanine-DNA methyltransferase (MGMT) promoter of the tumor to be a methylated one (Fig. 3A). Capillary electropherograms of PCR products resulting from amplification of microsatellite loci on chromosomes 1p and 19q revealed that the tumor samples contained 1p/19q codeletion (Fig. 3B). The patient then received external beam radiotherapy up to 60 Gy with concurrent daily temozolomide treatment (75 mg/kg),

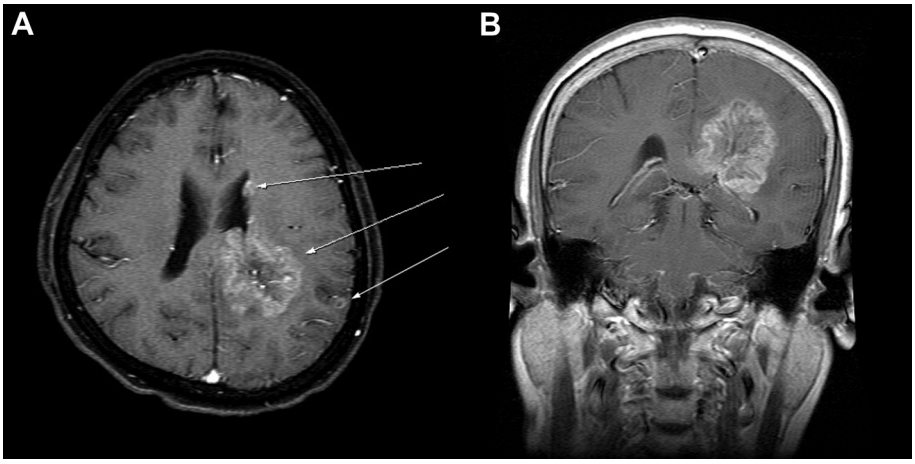

Figure 1 Magnetic resonance imaging of the patient's brain. (A) Axial T1-weighted image with gadolinium enhancement shows a large left-sided parieto-occipital lesion, located at the subcortical region but extending into the ipsilateral corpus callosum, and two concurrent small lesions in the ipsilateral lateral ventricle wall and parietal cortex (arrows). (B) Coronal section of the largest lesion shows compression of the left lateral ventricle and extension into the corpus callosum.