SPANDIDOS PUBLICATIONS

ONCOLOGY LETTERS 12: 731-733, 2016

Isolated brain metastasis as a late recurrence of completely resected non-small cell lung cancer

LIXIA JU and MINGQUAN HAN

Department of Integrative Medicine, Tongji University School of Medicine, Tongji University Affiliated Shanghai Pulmonary Hospital, Shanghai 200092, P.R. China

Received January 9, 2015; Accepted February 19, 2016

DOI: 10.3892/ol.2016.4674

Abstract. The brain is one of the most common sites for non-small cell lung cancer (NSCLC) metastasis; however, late isolated brain metastasis as a recurrence of NSCLC is rare. The present study describes a case of isolated solitary brain metastasis as a late recurrence of NSCLC, which occurred >2 years following the successful resection of the primary tumor, and was identified by magnetic resonance imaging. To the best of our knowledge, this is the first report of isolated brain metastasis as a postoperative recurrence of NSCLC. The aim of the present study was to highlight that, despite its rarity, such recurrence should be considered possible, and particular attention to the treatment of such patients should be paid.

Introduction

Metastatic brain tumor is the most common type of intracranial neoplasm in adults (1), with a reported survival rate of 3-6 months (2). Patients with lung cancer have been shown to develop brain metastasis at an early stage, usually within the first 2 years following the diagnosis of the primary tumor (3,4). It has been reported that 25-40% of patients with non-small cell lung cancer (NSCLC) develop brain metastasis during the course of their disease (5). The majority of recurrent tumors are distant, and >80% of them occur within the first 2 years subsequent to NSCLC resection (6-9). A previous study has reported that the 1- and 2-year post-recurrence survival rates are 69.8 and 44.4%, respectively (10). Recurrence after >2 years is considered late recurrence, although isolated solitary brain metastasis as a late postoperative recurrence of NSCLC is rare (11). The present study describes the case of a 64-year-old male patient with NSCLC who presented with an isolated solitary brain metastasis 28 months following the complete resection of the primary tumor.

Correspondence to: Dr Lixia Ju, Department of Integrative Medicine, Tongji University School of Medicine, Tongji University Affiliated Shanghai Pulmonary Hospital, 507 Zhengmin Road, Tongji, Shanghai 200092, P.R. China
E-mail: jvlixia@126.com

Key words: non-small cell lung cancer, brain metastasis, recurrence

Case report

A 64-year-old male patient was admitted to the Tongji University Affiliated Shanghai Pulmonary Hospital (Shanghai, China) in March 2011 for examination of a chest mass in the left lower lobe of the lung. The patient was asymptomatic. Upon admission, a laboratory examination was performed, which revealed a lactate dehydrogenase level of 159 IU/l (normal range, 94-250 IU/l). The serum level of carcinoembryonic antigen (CEA) was 48.77 μg/ml (normal range, 0-10 μg/ml). Computed tomography scan (Brilliance 16; Philips Healthcare, Amsterdam, The Netherlands) and chest X-ray (DigitalDiagnost DR; Philips Healthcare) revealed a poorly defined mass located in the lower lobe of the left lung, with ipsilateral mediastinal lymph node swelling. No malignant cells were observed following transbronchial and percutaneous aspiration lung biopsy. As no metastatic lesions were identified, surgery was selected as the appropriate treatment option, and the lower lobe of the lung was removed on April 1, 2011. The pathological diagnosis was adenocarcinoma and stage IB (T2N0M0) NSCLC. The patient refused postoperative adjuvant chemotherapy. A follow-up magnetic resonance imaging (MRI) scan (Intera 1.5T; Philips Healthcare) conducted 28 months following the initial diagnosis of NSCLC detected a metastatic lesion in the left occipital lobe of the cerebral hemisphere (Fig. 1). In addition, the patient's CEA level had risen to 80.19 μg/ml. Systemic imaging evaluation identified no tumor recurrence at the primary site and no other distant metastases. The patient was then administered a 30 Gy dose of whole brain radiation therapy (WBRT; Lightspeed RT; GE Healthcare, Little Chalfont, UK). No chemotherapy was prescribed. At the time of writing the patient remained healthy 1 year following the successful treatment of the metastatic tumor.

The present case report conformed to the Ethical Guidelines for Clinical Studies issued by the Ministry of Health, Labor and Welfare of China (12), and written informed consent was obtained from the patient.

Discussion

Brain metastasis in NSCLC is the most common type of intracranial metastasis, and 10% of NSCLC patients are diagnosed with brain metastasis at the initial stage of

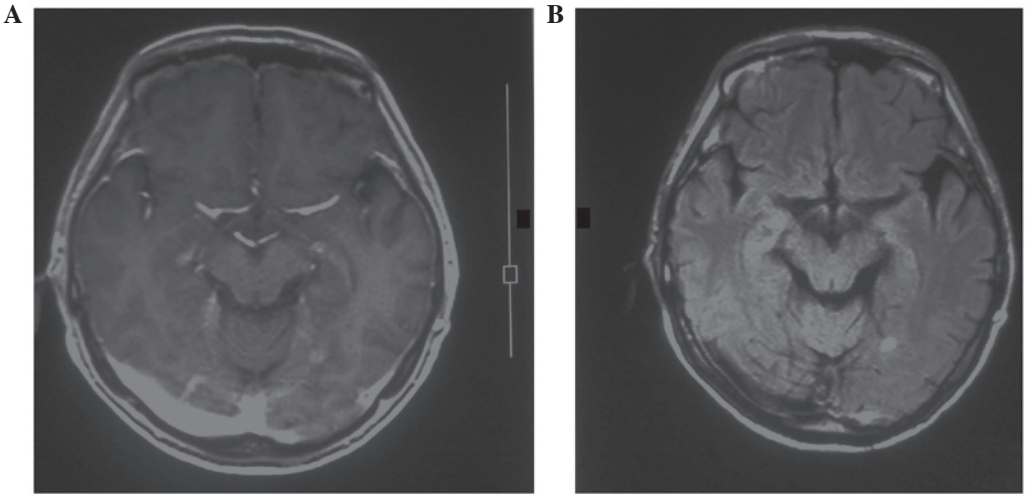

Figure 1. A metastatic lesion was identified in the left occipital lobe of the cerebral hemisphere during a follow-up magnetic resonance imaging scan. (A) Unenhanced scan. (B) Contrast-enhanced scan.

NSCLC, while 30-50% of patients are diagnosed at later stages (13). The majority of chemotherapy drugs fail to treat brain metastasis; despite the fact that the blood brain barrier around the brain tumor is damaged, the concentration of the chemotherapy drugs in the brain remains low, possibly due to efflux pump-mediated resistance (14). These patients usually have a poor prognosis, being the median survival time of 4-6 months in treated patients, compared with 1 month in untreated patients (15,16). WBRT is the most common treatment modality for brain metastasis in NSCLC, since it has an effect on palliation and stabilization of cranial progression and has been shown to prolong survival in all patients with brain tumors (17).

The prognosis of patients with recurrence following complete surgical resection of NSCLC is considered to be a multifactorial process, which depends on clinicopathological, biological and treatment characteristics (18). The reported recurrence rates following complete NSCLC resection are 30-75% (6,7,8,9,19,20), and ~15% for pathological stage I cases (21,22). The late recurrence of lung cancer has become an increasing subject of research, due to the high level of curability and the likelihood of long-survival (23). The development of isolated solitary brain metastasis is not a common occurrence for patients with lung adenocarcinomas, and a proportion of those patients has a favorable prognosis (24-26).

The present study describes a case of isolated solitary brain metastasis as a late recurrence of completely resected NSCLC. To the best of our knowledge, no similar reports of late isolated solitary brain metastasis as a postoperative recurrence of NSCLC have been previously described in the literature. The patient of the present study was a long-term survivor who was treated with WBRT alone. The brain metastasis was not confirmed by histology; it was detected by brain MRI scan without any presenting symptoms. At the time of writing, the patient was healthy 1 year following the successful treatment of the metastatic tumor using WBRT. Therefore, clinicians should consider whether chemotherapy is required in cases of isolated solitary brain metastasis as a late recurrence of completely resected NSCLC.

Acknowledgements

The present study was financially supported by the National Natural Science Foundation of China (Beijing, China; grant. no. 81207106), the Traditional Chinese Medicine Research Fund of Shanghai Municipal Health Bureau (Shanghai, China; grant no. 2012L051A), Fund of Shanghai Municipal Health Bureau (Shanghai, China; grant no. 20124Y123), and the Science and Technology Commission of Shanghai Municipality (Shanghai, China; grant nos. 14401932200 and 12401907500). The authors would also like to thank Professor Rongzheng Ren for revising the present manuscript.

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