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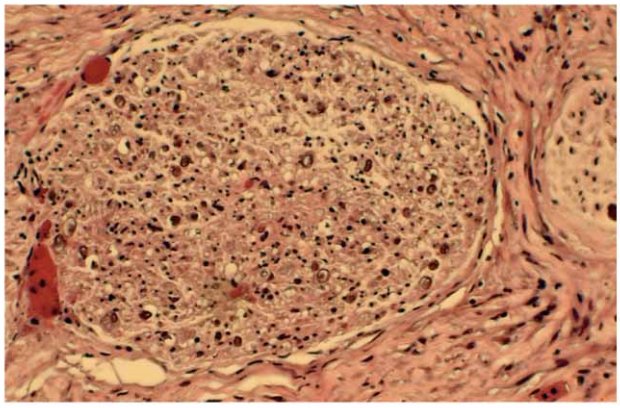

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Management of Brain Metastases: A Case Study

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Introduction

A 53-year-old male patient presented with headache, right-sided motor dysfunction, impaired vision, and intermittent confusion since one week. The medical history included former alcoholism, chronic pancreatitis with insulin-dependent diabetes, and nicotine abuse.

Computed cranial tomography (CCT) showed an 8-cm, partially cystic lesion with marked contrast agent uptake and perifocal edema in the left temporoparietal lobes (Fig 1A) and an additional small lesion in the right parietal lobes (Fig 1B). Due to the cerebrospinal fluid circulation impairment, acute craniotomy and neurosurgical resection of the left parieto-occipital lesion was performed.

What Is Your Diagnosis?

The histopathological examination revealed metastases of a solid carcinoma, most likely a non-small-cell carcinoma of the lung (Fig 2). Immunohistochemically, the tumor tissue was positive for cytokeratin 7 (CK-7) and thyroid transcription factor 1 (TTF1) and negative for synaptophysin, neuron-specific enolase (NSE), and chromogranin A. Indeed, a whole-body CT showed a 5-cm and several smaller tumourous lesions with inhomogeneous contrast medium enhancement in both lungs (Fig 3). In addition, there were a 4-cm metastasis in the right adrenal gland and abdominal lymph node metastases.

Clinical Course

We treated the patient with whole-brain radiotherapy (WBRT) at 30 Gray (Gy) in 10 fractions, stereotactic radiosurgery of the right parietal metastasis, and 8 cycles of intravenous chemotherapy with cisplatin and etoposide. The therapy was well-tolerated. Periodic re-staging CTs showed a stable systemic disease according to the RECIST criteria and initially there was complete response of the cerebral metastases. However, 11 months after first diagnosis, a follow-up MRI showed 2 new intracerebral metastases, one in the cerebellum and one in the parietal lobe. At this time, there was stable systemic disease as documented by CT and the patient was in good clinical condition (Karnofsky Performance Status 80 %). We treated both new brain metastases with radiosurgery. Two months later, a follow-up MRI showed no neoplastic lesions but

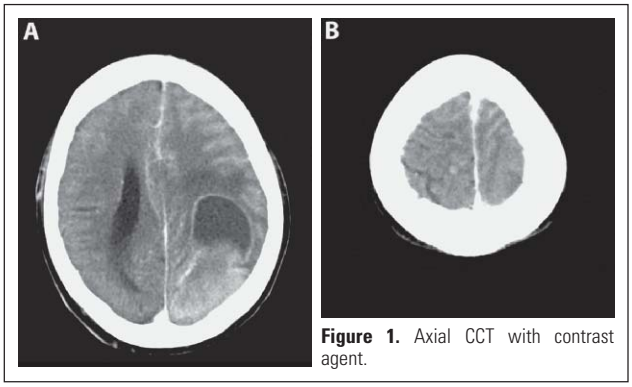

Figure 1. Axial CCT with contrast agent.

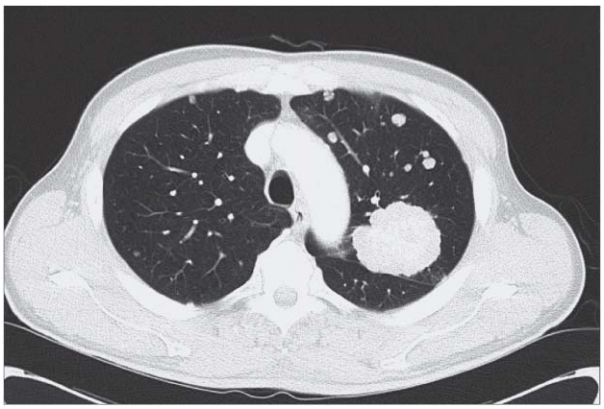

Figure 3. Thoracic CT with contrast agent.

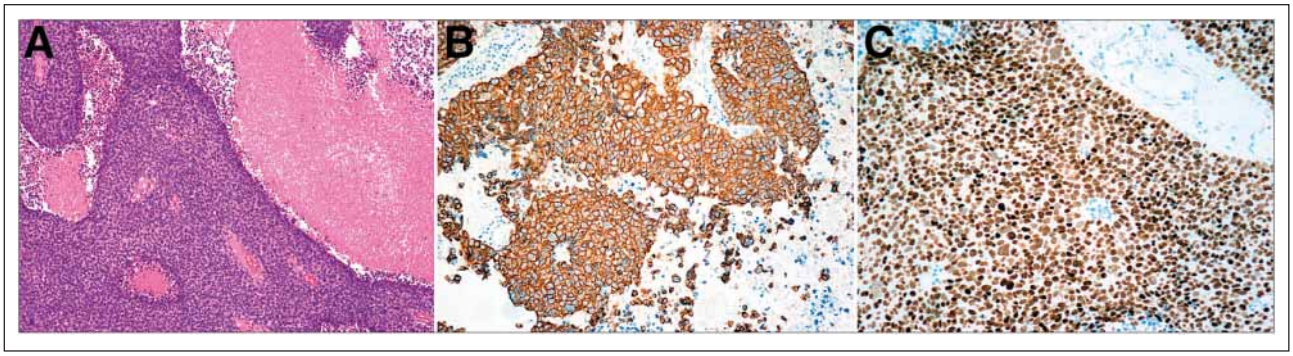

Figure 2. Histopathology and immunohistochemistry. **(A)** Hematoxylin and eosin, **(B)** anti-cytokeratin (Lu-5), **(C)** anti-thyroid transcription factor (TTF) 1-alpha.

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marked leukoencephalopathy (Fig 4). There was progressive decline with episodes of confusion, repeated seizures, and somnolence despite intensive symptomatic therapy. A home palliative care unit was involved and the patient died 14 months after initial diagnosis.

Comments

Brain metastases are the most common malignancy of the central nervous system. The most common primary carcinomas are lung cancer, breast cancer, melanoma, colorectal cancer, renal-cell carcinoma, and cancer of unknown primary origin [1]. Prognosis of patients with brain metastases is generally poor (median survival 2.3–7.1 months) and therapy aims to provide optimum quality of life while reducing tumour relapses [2]. Appropriate treatment is based on prognostic indices which consider the patient's age, Karnofsky Performance Status, number of brain metastases, and the activity of extracranial disease [3]. The modern multidisciplinary management of brain metastases includes neurosurgical resection, stereotactic radiosurgery, WBRT as well as systemic therapies [4]. Surgery of a single metastasis may be considered in patients with controlled systemic disease and good performance status with the aim to relieve symptoms associated with a large tumor or impairment of CSF flow, achieve local control, or establish a histopathological diagnosis [2]. Stereotactic radiosurgery permits the treatment of few metastases of 3–3.5 cm maximum diameter. [2] Adjuvant WBRT after surgery or radiosurgery significantly reduces intracranial relapses and neurologic deaths, but does not improve functional independence or overall survival [5]. The true risk of cognitive deficits in long-term survivors is not well-known. The limiting factors for systemic therapy like chemotherapy, radiosensitizers, and biologic agents are the blood-brain-barrier penetration and the efficacy in specific tumour histologies [2]. In conclusion, the ideal combination of treatments remains a matter of research. Further prospective series are needed to optimize and individualize care of patients with brain metastases.

Figure 4. Axial FLAIR-MRI.

References:

1. Gavrilovic IT, Posner JB. Brain metastases: epidemiology and pathophysiology. J Neurooncol 2005; 75: 5–14.

2. Soffietti R, Cornu P, Delattre JY, et al. EFNS Guidelines on diagnosis and treatment of brain metastases: report of an EFNS Task Force. Eur J Neurol 2006; 13: 674–81.

3. Sperduto PW, Berkey B, Gaspar LE, et al. A new prognostic index and comparison to three other indices for patients with brain metastases: an analysis of 1,960 patients in the RTOG database. Int J Radiat Oncol Biol Phys 2008; 70: 510–4.

4. Thomas SS, Dunbar EM. Modern multidisciplinary management of brain metastases. Curr Oncol Rep 2010; 12: 34–40.

5. Kocher M, Soffietti R, Abacioglu U, et al. Adjuvant whole-brain radiotherapy versus observation after radiosurgery or surgical resection of one to three cerebral metastases: results of the EORTC 22952-26001 study. J Clin Oncol 2011; 29: 134–41.

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