
Original Article

The Treatment of Metastatic Brain Tumors with CyberKnife — A Preliminary Report

Kuo-Hsing Liao¹, Chien-Min Lin¹, Jia-Wei Lin¹, Chia-Yuen Chen³,
Wen-Ta Chiu^{1,4}, Jo-Ting Tsai^{2*}

Abstract

Background

The treatments of metastatic brain tumor are multimodalities, such as surgical excision, whole brain irradiation, stereotactic radiosurgery, or chemotherapy. Nowadays, the stereotactic radiosurgery plays a critical role for the treatment of metastatic brain tumor because of the high accuracy, less radiation damage to normal brain tissue, and good compliance of patients. CyberKnife, newly developed frame-less stereotactic radiosurgery, is applied for brain tumors treatment widely. We presented our preliminary experience for treatment of metastatic brain tumors with CyberKnife in Taiwan.

Methods

From September 1st, 2005 to August 31st, 2006, ten patients with metastatic brain tumors were treated with CyberKnife in Taipei Medical University-Wanfang Hospital. Among them, Age, sex, tumor volume, radiation dose, histological types, and tumor-control rate were reviewed.

Results

The average age was 47.3 years (ranged 29.9 to 63.8 years). The male to female ratio was 2/3. The primary malignance included five lung cancers and five breast cancers. Four cases were solitary metastatic brain tumor while six cases were multiple intracranial foci. The mean follow up period was 5.3 months (range from 1.3 months to 12.0 months). Among total 33 lesions, the mean tumor volume was 7.48 ml, and the mean radiation dose (maximum dose) was 2024.98 cGy. The mean tumor volume in post-treatment 3 months (n=13) was 3.13 ml with 77.8% good response rate. The mean tumor volume in post-treatment 6 months (n=6) was 1.74 ml with 83.3% good response rate.

Conclusions

CyberKnife is a useful treatment modality for metastatic brain tumor. It provides frame-less and high accuracy stereotactic radiosurgery to control metastatic brain tumors. In our series, we demonstrated that CyberKnife had good local control rate for metastatic brain tumors without significant side effects. We believe that the CyberKnife could be applied more widely in the coming future, not only in neurosurgery but also in neuroncology.

Key Words: Metastatic brain tumors, CyberKnife, Stereotactic radiosurgery, Whole brain radiotherapy

Department of Neurosurgery¹, Department of Radiation Oncology², Department of Radiology³, Taipei Medical University-Wan Fang Medical Center, Institute of Injury Prevention and Control⁴, Taipei Medical University, Taipei, Taiwan

Running Title: CyberKnife and metastatic brain tumors

*Correspondence to: Dr. Jo-Ting Tsai

Taipei Medical University-Wan Fang Medical Center

No. 111, Section 3, Hsing-Long Road, Taipei, 116, Taiwan

Fax:+886-2-2934-7054

Tel:+886-2-2930-7930 ext.1360

e-mail: kitty@wanfang.gov.tw