学 位 論 文 抄 録

Radiation therapy for brain metastases from non-small cell lung cancer; clinical outcome of biological effective dose (BED) based fractionated stereotactic radiation therapy and the predictive factor of intracranial distant recurrence

(非小細胞肺癌脳転移に対する放射線治療 ；

生物学的実効線量に基づいた分割定位放射線治療の臨床成績および頭蓋内再発の予測因子)

松山 知彦

熊本大学大学院医学教育部博士課程医学専攻放射線治療医学

指導教員

大屋 夏生 教授
熊本大学大学院医学教育部博士課程医学専攻放射線治療医学

Abstract of the Thesis

Background and Purpose: Fractionated stereotactic radiation therapy (FSRT) for brain metastasis (BM) is widely performed. However, the prescribed dose and fractionation schedule differ among institution. Moreover, indication of prophylactic whole brain radiation therapy is controversial. The purposes of this study were as follows: 1) to evaluate the efficacy and toxicity of BED-based FSRT for BM from non-small cell lung cancer (NSCLC). 2) to evaluate the relationship between the number of BMs and intracranial relapse in patients with BMs from NSCLC.

Methods and Materials: Between March 2005 and March 2009 we treated 299 patients with one to five BMs from NSCLC (573 total BMs) with FSRT. The dose fractionation schedules were individually determined to deliver a peripheral BED10 (α/β ratio = 10) of approximately 80 Gy_{10}. In the first study, the local control (LC) and overall survival (OS), local progression-free survival (LPFS) and intracranial relapse free survival (ICRFS) rate were calculated. In the second study, we retrospectively evaluated 222 patients who had no treatment history for BMs. Intracranial distant recurrent free (ICDRF) rate and OS rate were calculated.

Results: In the first study, LC rate at 12 months was 94.5%. By multivariate analysis the tumor diameter was the only factor predictive of the LC rate. The OS, LPFS, and ICRFS rates at 12 months were 63.3%, 57.8%, and 21.8%, respectively. Six patients manifested progressive radiation injury to the brain. In the second study, by univariate analysis, the 1 year ICDRF rate for patients with single BM was significantly better than for patients with multiple BMs. By multivariate analysis, the number of BMs and the extracranial disease status were the predictive factor of ICDRF rate. OS rate for patients with single BM was significantly better than for patients with multiple BMs in univariate analysis. The extracranial disease status and performance status were the significant predictive factors of intracranial distant recurrence, while the number of BMs was nearly significant in multivariate analysis.

Conclusions: This study showed that BED-based FSRT for BMs from NSCLC is a promising strategy that may yield excellent outcomes with acceptable toxicity, and the number of BMs is the predictive factor for ICDRF rate.