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CLINICAL STUDY - PATIENT STUDY

Hypofractionated stereotactic radiotherapy in combination with whole brain radiotherapy for brain metastases

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Abstract *Background* The efficacy and toxicity of hypofractionated stereotactic radiotherapy (HSRT) in combination with whole brain radiotherapy (WBRT), for the treatment of 1–4 brain metastases, using a non invasive fixation of the skull, was investigated. *Methods* Between 04/2001 and 01/2006 30 patients with 44 brain metastases underwent irradiation. Every patient received WBRT (10 × 3 Gy); 41/44 lesions received HSRT boost with a median dose fraction of 6 Gy, the fractionation schemes were 3 × 6 Gy and 4 × 8 Gy; a median total dose of 18 Gy was delivered to the tumor isocenter. *Results* The median survival period was 9.15 months, the actuarial 1-year overall survival and freedom from new brain metastases were 36.6% and 87.9%, respectively; at univariate analysis Karnofsky Performance Status (KPS) was statistically significant ($P = 0.05$); the actuarial 1-year local control for the 41/44 lesions was 86.1%. No patient had acute or late complications. *Conclusions* HSRT as a concomitant boost during WBRT is a safe and well tolerated treatment for selected patients with brain metastases.

Keywords Brain metastases · Hypofractionated stereotactic radiotherapy · Whole brain radiotherapy · Prognostic factors · Local control · Radiobiology

Abbreviations

HSRT	Hypofractionated stereotactic radiotherapy
SRS	Stereotactic radio-surgery
WBRT	Whole brain radiotherapy
KPS	Karnofsky performance status
BED	Biologic effective dose

Introduction

The brain is a common site for metastases; the primary tumor spreads to the brain mainly by hematougenous way. Whole brain radiotherapy (WBRT) has been the standard treatment for the past several decades. Recently, stereotactic radiosurgery (SRS) and hypofractionated stereotactic radiotherapy (HSRT) have become common due to their ability to deliver very high doses to a small volume and to obtain high tumor control rates [1]. It seems that from a biological point of view HSRT might have some advantage in comparison to SRS in terms of acute complications [2] and of tumor control rate for lesions larger than 10 cc (or more than 3 cm of diameter) [3, 4].

Studies demonstrate that the use of up-front WBRT for newly disgnosed brain metastases decrease the risk of methacronous brain metastases in comparison with SRS alone [5, 6].

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