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Int. J. Radiation Oncology Biol. Phys., Vol. 73, No. 2, pp. 486–491, 2009
Published by Elsevier Inc.
Printed in the USA.
0360-3016/09/$–see front matter

doi:10.1016/j.ijrobp.2008.04.070

CLINICAL INVESTIGATION **Brain**

RESECTION FOLLOWED BY STEREOTACTIC RADIOSURGERY TO RESECTION CAVITY FOR INTRACRANIAL METASTASES

LY DO, M.D.,* RICHARD PEZNER, M.D.,† ERIC RADANY, M.D.,† AN LIU, PH.D.,‡ CECIL STAUD, PH.D.,‡ AND BENHAM BADIE, M.D.§

*Department of Radiation Oncology, University of California, Irvine, School of Medicine, Orange, CA; Departments of †Radiation Oncology, ‡Radiation Physics, and §Neurological Surgery, City of Hope, Duarte, CA

Purpose: In patients who undergo resection of central nervous system metastases, whole brain radiotherapy (WBRT) is added to reduce the rates of recurrence and neurologic death. However, the risk of late neurotoxicity has led many patients to decline WBRT. We offered adjuvant stereotactic radiosurgery (SRS) or stereotactic radiotherapy (SRT) as an alternative to select patients with resected brain metastases.

Methods and Materials: We performed a retrospective review of patients who underwent brain metastasis resection followed by SRS/SRT. WBRT was administered only as salvage treatment. Patients had one to four brain metastases. The dose was 15–18 Gy for SRS and 22–27.5 Gy in four to six fractions for SRT. Target margins were typically expanded by 1 mm for rigid immobilization and 3 mm for mask immobilization. SRS/SRT involved the use of linear accelerator radiosurgery using the IMRT 21EX or Helical Tomotherapy unit.

Results: Between December 1999 and January 2007, 30 patients diagnosed with intracranial metastases were treated with resection followed by SRS or SRT to the resection cavity. Of the 30 patients, 4 (13.3%) developed recurrence in the resection cavity, and 19 (63%) developed recurrences in new intracranial sites. The actuarial 12-month survival rate was 82% for local recurrence-free survival, 31% for freedom from new brain metastases, 67% for neurologic deficit-free survival, and 51% for overall survival. Salvage WBRT was performed in 14 (47%) of the 30 patients.

Conclusion: Our results suggest that for patients with newly diagnosed brain metastases treated with surgical resection, postoperative SRS/SRT to the resection cavity is a feasible option. WBRT can be reserved as salvage treatment with acceptable neurologic deficit-free survival. Published by Elsevier Inc.

Stereotactic radiosurgery, Brain metastases, Postoperative, Helical tomotherapy, Neurologic deficit-free survival.

INTRODUCTION

Brain metastases occur in 20–40% of cancer patients (1, 2). Because the whole brain can be seeded with metastases, whole brain radiotherapy (WBRT) is considered the standard treatment (3). However, long-term neurotoxicity has been the major reason for the omission of WBRT from initial treatment to be replaced by more focal treatments (4, 5). For lesions that are accessible and symptomatic requiring urgent decompression, surgery is the treatment of choice for rapid debulking and relief of associated symptoms. It has been shown that the addition of WBRT to the surgical resection of brain metastases decreases local relapse and decreases death from neurologic causes (6). In addition, the addition of WBRT to resection resulted in increased overall survival compared with WBRT alone (7, 8).

However, several studies have shown that stereotactic radiosurgery (SRS) alone results in the same overall survival as SRS plus WBRT. However, local relapses were more common in patients treated with SRS alone (4). Other studies have also reported increased local relapses with SRS alone, with increased neurologic deficits associated with these local relapses (9). In these patients with limited life expectancies, the development of neurologic deficits after WBRT or with local relapse is an important clinical outcome. Most recently, a Japanese Phase III randomized trial revealed similar overall survival between the SRS and the SRS plus WBRT arms, with increased local relapses in the SRS-alone arm. However, neurologic preservation was similar between the two arms (10).

With increasing data about similar outcomes between SRS and SRS plus WBRT, the City of Hope National Cancer Center has been treating brain metastases with resection followed by postoperative SRS/stereotactic radiotherapy (SRT) with increased frequency. This is a report of our early experience.

Reprint requests to: Ly Do, M.D., Department of Radiation Oncology, University of California, Irvine, School of Medicine, 101 The City Drive Blvd., Orange, CA 92868. Tel: (714) 456-9074; Fax: (714) 456-7170; E-mail: lvdo@uci.edu

Conflict of interest: none.

Received Feb 12, 2008, and in revised form April 7, 2008. Accepted for publication April 11, 2008.