Local Control Rates with LINAC-Based Resection-Bed Hypofractionated Stereotactic Radiotherapy for Brain Metastases

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Introduction

Given recent evidence that better local control can be attained when surgery and resection-bed radiotherapy are combined, we sought out to retrospectively evaluate our experience with resection-bed hypo-fractionated stereotactic radiotherapy (FSRT) for brain metastases.

Methods

Between October 2009 to December 2012, 52 patients (13 male, 39 female, median age 61, range 30-96) were treated with fractionated-stereotactic radiotherapy (FSRT) following the resection of 55 brain metastases. Of the 55 lesions excised, 53 (96%) achieved gross tumor resection. The most common primary tumor site was melanoma (21 patients), followed by lung (9), renal cell carcinoma (8), breast (5), head and neck (3), ovarian serous (2), bladder (1), sarcoma (1), prostate (1), and adenoid carcinoma (1). Mean volume of PTV was 17.2 cm3 (1.2-129) with a prescribed median dose of 2500cGy (2000-3000) administered in 5 daily fractions.

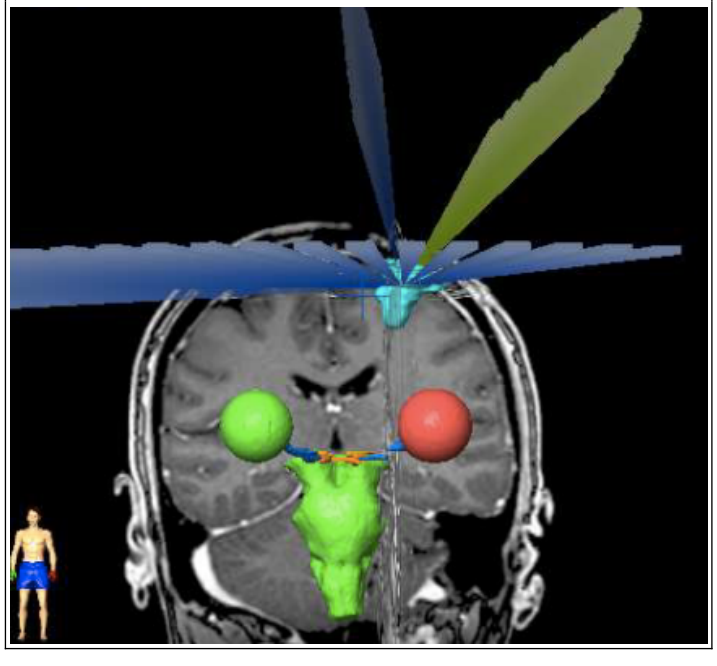
Results of Post- Operative Hypofractionated Stereotactic Radiation

Results		
Patients		52
Lesions		55
Gross Tumor Resection		53/55
Mean Follow Up (Range)		8.7 months
Follow Up Range		1.2-24.1 months
12 Month Local Control Rate		88%
12 Month Distant Control Rate		48%
Prognostic Factors for DB-RFS		**p value**
Single vs Multiple Metastasis	19.1 vs 3.6 months	0.001
KPS >70 vs <70	10.4 vs 2.8 months	<0.001

Results

Median follow up was 8.7 months (range, 1.2-24.1). Local and distant brain recurrence rates were 9% (5/55) and 46% (24/52) respectively. While median local-brain recurrence free survival (LBR-FS) was not reached, median distant-brain recurrence free survival (DBR-FS) was 6.9 months. At 12 months, the resection-bed local control rate and distant brain control rate were 88% and 48% respectively. Log-rank analysis showed a statistically significant difference in DBR-FS between patients with a single brain metastasis compared to those with multiple brain metastases (19.1 v 3.6 months, p=.001), and for those patients with a KPS >70 (10.4 v 2.8 months, p<0.001). One patient developed radiation necrosis that required surgical intervention.

Hypofractionated Stereotactic Radiation Treatment Plan



Conclusions

LINAC-based resection-bed FSRT resulted in an acceptable 12-month local control with minimal toxicity and side effects.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Understand the importance of local control of brain metastasis 2) Appreciate the role of FSRT as an adjuvant therapy to surgery in local control of brain metastasis 3) Identify factors that influence disease control rates with FSRT

Hypofractionated Stereotactic Radiation Dose Distribution