



# A Phase II Trial of Focal Fractionated Radiosurgery with/without Surgery in Patients with 1 to 3 Symptomatic Brain Metastases

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## Introduction

The combination of Focal Fractionated Radiosurgery with surgical resection in the treatment of brain metastasis has not been widely investigated. This study is a Phase II trial of focal fractionated radiosurgery with or without surgery in patients with 1 to 3 symptomatic brain metastases.

## Materials & Methods

40 patients with 1-3 symptomatic brain metastases prospectively treated with Focal Fractionated Radiosurgery (FFR) ± surgery. Metastases were deemed symptomatic if associated with related clinical symptoms/signs or neuroradiological evidence of mass effect.

- Median age: 60 years
- Median Karnofsky Performance Score: 80
- Follow-up ranged from 1 to 50 months
- RPA class I: 11 patients
- RPA class II: 29 patients
- 1 patient exited the protocol immediately after completion of FFR and hence ineligible for evaluation

- 77+ metastases in the patient population.
- 1 metastasis at presentation: 26 patients
- 2 metastases at presentation: 4 patients
- 3 metastases at presentation: 8 patients
- 4 metastases at presentation: 1 patient
- miliary metastases presentation (15+): 1 patient

- 38 metastases treated with surgery + FFR
- 12 metastases treated with FFR only
- 27+ non symptomatic brain metastases observed
- Target volume ranged from 0.9 to 64 cm<sup>3</sup> (mean 17.4 cm<sup>3</sup>, median 11.5 cm<sup>3</sup>).
- The target consisted of surgical cavity or brain metastasis respectively (FFR only)
- All patients treated with FFR using serial tomotherapy with an intensity modulated algorithm.
- All patients received 30 Gy in 5 fractions.

## Results

Median follow up was 14 months (mean 17.2 months, range 1 - 50 months).

Overall median survival was 14 months.

Median RPA class I survival was 29.2 months and class II survival was 12.5 months. (p = 0.022).

Patients spent a mean of 82% of their survival time with a Karnofsky Performance Score > 70.

25 patients died. 19 of non-neuro causes, 5 of neuro causes, 1 of unknown causes

There were 77+ metastases (1 pt had miliary disease)

50 metastases were treated with FFR

38 metastases were treated with surgery before FFR

27+ non symptomatic brain metastases were observed

1 patient exited the protocol immediately after the completion of FFR and hence was ineligible for evaluation.

There were 22 failures in 17 patients.

There were 4 local failures in 3 patients (recurrence at the site of treatment)

There were 18+ (2 pt had miliary disease) distant failures in 16 patients (recurrence outside of the treatment area)

2 patients had both local and distant failures

Treatment of Failures consisted of: Surgery + FFR at 5 sites (5 patients); Surgery only at 1 site in 1 patient (atypical cells / radiation necrosis in treated area). FFR only at 7 sites (6 patients); Gamma knife at 3 sites (3 patients); WBRT in 5 patients; 1 patient was planned for WBRT but died before treatment.

## Conclusions

FFR ± surgery, without whole brain radiotherapy, seems to be an effective modality to control neurological diseases in patients with 1-3 symptomatic brain metastases.

## Learning Objectives

Focal Fractionated Radiosurgery is effective in controlling symptomatic brain metastasis with and without surgery.

