

## A Retrospective Analysis of SRS Failures in Breast Cancer Brain Metastases: An Institutional Review

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Published 04/02/2023

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Oraiqat I, Mills M, Libby B, et al. (April 02, 2023) A Retrospective Analysis of SRS Failures in Breast Cancer Brain Metastases: An Institutional Review. Cureus 15(4): a853

### Abstract

**Objectives:**

This study was a retrospective analysis of the local failure and/or recurrence of breast cancer brain metastasis for patients treated between 2017-2019 at our institution.

**Methods:**

There were 268 breast cancer brain metastases treated with stereotactic radiosurgery (SRS) at our institution between 2017-2019. A sample of 66 lesions (20 patients) were selected for analysis. The following plan evaluation metrics were collected from two treatment planning systems and were compared between locally controlled and failed lesions: conformity index (CI), planning target volume (PTV), gross tumor volume (GTV), maximum dose to the PTV (Dmax), minimum dose to the PTV (Dmin), prescription dose and Rx volume receiving the prescription dose (VRx). A two-tailed t-test was used to determine statistical significance between groups.

**Results:**

Of this cohort, 9 patients (18 total lesions) experienced local failures. Prescription doses ranged from 14-24 Gy based on maximum lesion diameter and tumor location. The CI was comparable between the two cohorts, 1.31 ( $\pm 0.47$ ) and 1.25 ( $\pm 0.16$ ) for the locally controlled and failed cohorts, respectively ( $p=0.62$ ). Mean values demonstrated that the locally controlled cohort had smaller PTVs ( $0.76 \pm 1.3\text{cc}$  vs  $2.40 \pm 4.58\text{cc}$  ( $p=0.03$ )), higher Dmax ( $24.80 \pm 2.69\text{Gy}$  vs  $22.91 \pm 2.79\text{Gy}$  ( $p=0.02$ )), and a trend towards higher Dmin ( $20.60 \pm 2.38\text{Gy}$  vs  $19.60 \pm 2.37\text{Gy}$  ( $p=0.10$ )) than the local failure cohort. The DRx was higher for locally controlled lesions ( $21.74 \pm 2.08\text{Gy}$  vs  $20.41 \pm 2.37\text{Gy}$  ( $p=0.03$ )). The VRx was comparable between the two cohorts ( $97.64\% \pm 1.61\%$  for controlled lesions vs  $97.45\% \pm 0.91\%$  ( $p=0.67$ )) for the local failure cohort). There were no differences in local control based on breast cancer subtype.

**Conclusion(s):**

The review of local failures and/or recurrence in breast cancer brain metastases for patients treated between 2017-2019 in our institution revealed that smaller lesions receiving higher doses to the PTV resulted in fewer local failures or recurrence. A continued analysis with additional lesions and dosimetric parameters may help inform future treatment with radiosurgery of breast cancer brain metastases.