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Abstract

# Stereotactic Radiosurgery with Immunotherapy Improves Overall Survival in Patients with Either Melanoma or Non-Small Cell Lung Cancer Metastatic to the Brain: an Analysis of the National Cancer Database

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## Abstract

Objectives: Immunotherapy has been shown to improve survival for patients with metastatic melanoma or metastatic non-small cell lung cancer (NSCLC). A recent phase III trial found that whole brain radiotherapy (WBRT) was not associated a significant reduction in distant intracranial failure or overall survival (OS) in metastatic melanoma. There is evidence that stereotactic radiation may augment the efficacy of immunotherapy. Therefore, the aim of this analysis is to assess the role of stereotactic radiosurgery (SRS) and WBRT when added to immunotherapy in patients with melanoma or NSCLC metastatic to the brain in a national hospital-based database.

Methods: Using the NCDB, 692 patients with melanoma metastatic to the brain and 804 patients with NSCLC metastatic to the brain who had been treated with immunotherapy were identified. Patients were defined as receiving SRS if they received 5 or fewer fractions with a dose of 6 Gy or more per fraction to the brain. Other patients who received external beam radiation to the brain were defined as having received WBRT. Kaplan Meier and multivariate Cox regression analyses were performed to evaluate the impact of SRS and WBRT on OS in patients receiving immunotherapy.

Results: In the melanoma dataset, 71 (10.3%) received immunotherapy with no radiation, 234 (33.8%) received SRS and immunotherapy, and 387 (55.9%) received WBRT and immunotherapy. Mean follow up time was 15.9 months. Adding SRS to immunotherapy was associated with improved OS in univariate (HR=0.58, p=0.007) and multivariate analyses (HR=0.56, p=0.015) adjusted for demographics, academic center, functional status, and disease severity. In the NSCLC dataset, 203 (25.3%) received immunotherapy with no radiation, 445 (55.4%) received SRS and immunotherapy and 156 (19.4%) received WBRT and immunotherapy. Mean follow up time was 15.2 months. Similar results were seen in NSCLC where the addition of SRS to immunotherapy was associated with improved OS in univariate (HR=0.76, p=0.042) and multivariate analyses (HR=0.74, p=0.027) adjusting for demographics, academic center, and functional status. Further adjustment for T and N stage was of borderline significance (HR=0.76, p=0.053). There was no difference in OS with the addition of WBRT to

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immunotherapy in patients with melanoma or NSCLC.

Conclusions: This analysis suggests that among patients with melanoma or NSCLC with brain metastases, treatment with SRS and immunotherapy is associated with improved OS compared to immunotherapy alone. This improvement in OS is not seen when comparing WBRT and immunotherapy to immunotherapy alone.