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Neurological Benefits of a Radiosurgery-Alone Approach to Small Cell Lung Cancer Brain Metastases

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Abstract
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Abstract

Objectives:

The management of brain metastases has evolved in most disease sites to favor stereotactic radiosurgery over whole brain radiation therapy due to its favorable neurocognitive toxicity profile. However, this remains controversial in patients with small cell lung cancerfor whom the historical standard of care has been whole brain radiation therapy. We look at a large cohort of consecutive patients with brain metastases from a small cell lung cancer primary that were treated with stereotactic radiosurgery. Our primary objective is to review the rate of future symptomatic intracranial progression following SRS. Our secondary objective is to assess any association between SRS failure and prior exposure vs. naivety to whole brain irradiation.

Methods:

Records were obtained from an IRB-approved database for all patients treated with Gamma Knife radiosurgery for brain metastasis from SCLC from April 2014 to April 2022. Outcomes of neurologic symptom-free survival (NFS: time from GKRS to steroid treatment due to intracranial disease progression) and intracranial progression-free survival (iPFS) were recorded. Inferential statistics were applied to generate Kaplan-Meier curves of NFS and iPFS. Significance values and statistical parameters are reported. Analysis was performed using IBM SPSS using a P value < 0.05 for statistical significance.

Results:

46 patients were identified. The mean age was 66 (range 58 to 76). 38 patients had not had previous WBRT, 8 had prior PCI, and 3 prior WBRT. The median number of brain metastases treated was 2 (range 1-38). Median tumor size was 0.15 cc (range 0.04 - 29.1 cc) and SRS dose were 0.15 cc and 20 Gy/1fx (range 16 Gy – 20 Gy), respectively.

6 month and 12 month overall intracranial progression free survival were 42% and 23% respectively. 6 month and 12 month neurological symptom free survival were 96% and 90% respectively. In total, 4 patients out of 46 (9%) presented with neurological symptoms following SRS felt to be secondary to progression of disease. These symptoms included severe headache (n=2), gait instability and visual disturbance (n=1), and hemiparesis and dysarthria (n=1). 9 other patients were treated with steroids for prophylaxis or to mitigate treatment effects. Prior exposure to any form of whole brain irradiation was non-significant for association with either iPFS or NFS. As of last follow-up, there was one confirmed death attributed to neurological progression of disease.

Conclusion(s):

Our data supports the role of SRS in the management of brain metastases in patients with SCLC. Given the biology of SCLC, it is not surprising that the majority of patients will develop future CNS relapse following initial SRS. However, in the setting of close interval MRI follow-up, it is uncommon for patients to present with symptomatic disease, and can be managed with salvage therapy at the time of progression, as evidenced by the minority of patients who did experience symptomatic progression. In the setting of previous studies that have suggested that overall survival is not negatively impacted using SRS, our study supports that SRS can be a useful tool in optimizing neurocognitive quality of life in this patient population.