Management of Brain Metastases from Large Cell Neuroendocrine Carcinoma of the Lung: Improved Outcomes with Radiosurgery

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Abstract

Objectives: Large Cell Neuroendocrine Carcinoma (LCNEC) of the lung is a rare pulmonary tumor characterized by the presence of both neuroendocrine morphology and immunohistochemical evidence of neurochemical markers, not meeting criteria for the better recognized small cell lung cancer (SCLC) but having similar natural history and management strategy. As such, the management of brain metastases in these patients has mirrored that of SCLC through the use of whole brain radiation therapy (WBRT) as opposed to stereotactic radiosurgery (SRS). We used the National Cancer Database (NCDB) to look at predictors of SRS and any potential differences in outcomes for patients with brain metastases from LCNEC.

Methods: We queried the NCDB from 2004-2015 for patients with LCNEC of the lung with brain metastases at diagnosis that received brain radiation. Univariable and multivariable analyses were performed to identify sociodemographic, treatment, and tumor characteristics predictive of SRS use and overall survival (OS). Propensity-adjusted Cox proportional hazard ratios for survival were used to account for indication bias.

Results: Out of 9,970 patients with LCNEC of the lung we identified 348 with brain metastases at time of diagnosis. Sixty-eight patients were treated with up front SRS and 280 were treated with WBRT. Patients that were treated at an academic facility or received chemotherapy as part of up front treatment were more likely to receive SRS. Of note, comorbidity score, age, and absence of other extracranial metastases were not predictive of SRS utilization. Univariable analysis revealed improved outcomes with SRS compared to WBRT, with a median overall survival of 11 months compared to 6 months, respectively (p=0.007). Multivariable Cox regression with propensity score confirmed SRS to have an improved survival (HR: 0.68, 95%CI: 0.51-0.91, p=0.0093). Multivariable Cox regression with propensity score also identified younger age, receipt of chemotherapy, absence of extracranial disease, and non-rural locations as additional predictors of improved overall survival.

Conclusions: In this NCDB analysis, treatment of brain metastases from LCNEC of the lung with SRS was associated with improved survival. For the appropriate patient (younger, absence of extracranial metastases, and ability to receive chemotherapy) up front treatment of limited brain metastases with SRS may be appropriate.

Cureus

2019 Wegner et al. Cureus 11(3):
a366.

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