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Clinical Outcomes of Stereotactic Radiosurgery for Different Neuroendocrine Tumor Brain Metastases: A Systematic Review

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Abstract

Objectives:

Neuroendocrine tumor (NET) brain metastases (BM) are rare malignancies which frequently bear a poor prognosis and have the potential to secrete hormones. Optimal treatment approach for NET BM remains unclear, with significant heterogeneity both across and within primary tumor types, and limited outcome data. Given their known differences in clinical course and genetic profile, we aim to summarize reports of BM across different NETs treated with SRS.

Methods:

A comprehensive literature search was performed in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Search terms included ("neuroendocrine tumor" OR "neuroendocrine neoplasm" OR "neuroendocrine carcinoma" OR “NET”) AND ("brain metastasis" OR "brain metastases" OR “intracranial metastases”) AND ("stereotactic radiosurgery" OR "stereotactic body" OR "CyberKnife" OR "GammaKnife").

Results:

Our search strategy yielded 230 unique items, of which 21 articles comprising 298 patients were included for a full-text review. The most commonly investigated primary tumor was pulmonary NET (n = 5), followed by Merkel cell carcinoma, and neuroendocrine cervical carcinoma. The number of patients per study cohort ranged from 1 to 101 (mean = 17), with a range of 1 to 14 BM (median = 2). The median prescribed SRS dose was 24 Gy. Post-SRS survival ranged from 4.5 to 35 months (median = 9).

Conclusion(s):

Given the recent increase in age-adjusted incidence of NET BM, determining an optimal treatment approach for these malignancies is of growing importance. Prognosis generally remains poor, with BM being a significant predictor of overall survival. Our review indicates large variability in outcomes both between and within primary tumor types, suggesting a need for further investigation of predictive molecular biomarkers.