

Stereotactic Magnetic Resonance-guided Adaptive Radiation Therapy for Gastrointestinal Neuroendocrine Tumors: Assessing Local Control and Toxicity

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Abstract

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Abstract

Objectives: This investigation aimed to evaluate the efficacy and safety of magnetic resonance-guided radiotherapy (MRgRT) delivered to patients with well-differentiated gastroenteropancreatic neuroendocrine tumors (GEP-NETs) using a standardized workflow.

Methods: A retrospective review was conducted on 25 patients diagnosed with abdominal neuroendocrine tumors treated with MRgRT from 2019 to 2023 using a standardized stereotactic MR-guided adaptive radiation therapy (SMART) workflow involving daily adaptation and breath-hold gating. After excluding patients with neuroendocrine carcinomas and other noneligible conditions, 20 patients with well-differentiated GEP-NETs were included in the final analysis. Data on demographics, clinical characteristics, treatment details, and outcomes were collected. Primary endpoints were local control and radiation toxicity; secondary endpoints were progression-free survival (PFS) and overall survival (OS) calculated from the date of MRgRT.

Results: The study cohort had a median age of 54 years, with 65% being male. The majority of tumors were of pancreatic origin 14 (70%), and 90% were metastatic at the time of MRgRT. The median post-treatment follow-up was 35 months. The treatment was well-tolerated, with only 2 (10%) patients experiencing acute grade 3 treatment-related toxicity. Local control was achieved among 95% of patients, with a median PFS of 30 months (95% CI: 16-NA). No significant variables were associated with PFS or toxicity in the univariate analysis.

Conclusion(s): Magnetic resonance-guided radiotherapy using the SMART workflow delivered a well-tolerated treatment with high rates of durable local control for patients with GEP-NETs, including those with metastatic disease. This treatment should be considered a viable alternative for patients who are not candidates for other locoregional therapies.