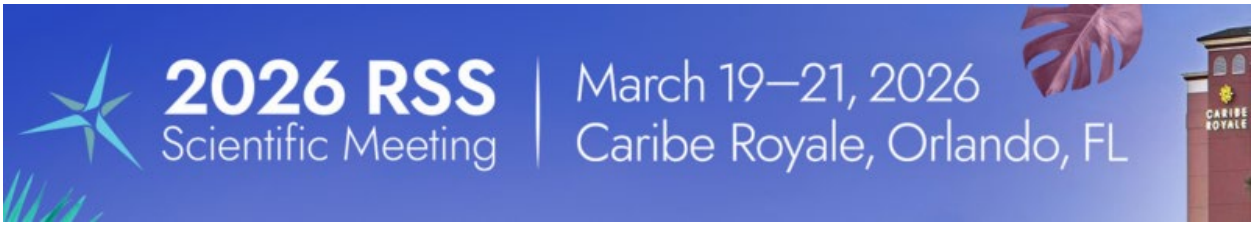

Comparative Outcomes of Conventionally Fractionated and Hypofractionated Radiation Therapy for Low-Grade Meningiomas: A Single-Institution Retrospective Analysis

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Objectives: Low-grade meningiomas (WHO Grade I) are the most common primary intracranial tumors and typically exhibit favorable outcomes following radiation therapy (RT). Two widely used RT modalities for these tumors include conventionally fractionated RT (CFRT) and hypofractionated stereotactic RT (hSRT). However, comparative data evaluating clinical outcomes between these fractionation strategies remain limited, warranting further investigation. Clarifying the relative efficacy profiles of these regimens may help guide optimal fractionation selection for patients with benign meningiomas.

Methods: A retrospective review was performed of patients with WHO Grade I meningiomas treated with radiation therapy at Thomas Jefferson University Hospital. Patients received either conventionally fractionated RT (CFRT; treated between 2015–2025) or hypofractionated stereotactic RT (hSRT; treated between 2013–2022). Local control (LC) was assessed to measure clinical outcomes. Kaplan–Meier estimates were used to assess local control (LC), and Cox proportional hazards regression was performed to identify predictors of recurrence. For the CFRT group, we also analyzed whether Ki-67, patient age, and prior surgery status impacted the rate of LC.

Results: A total of 203 patients were included, of whom 111 (54.68%) received CFRT and 92 (45.32%) received hSRT. The median follow-up was 54.2 months (CFRT) and 28.0 months (hSRT). One, three, and five-year local control (LC) for the CFRT cohort was 99.1%, 99.1%, and 89.7%, respectively. For the hSRT cohort, the one, three, and five-year LCs were 97.8%, 92.9%, and 87.3%, respectively. Upon further analysis, Ki-67, age, and surgery status did not significantly impact the LC rate within the CFRT cohort ($p < 0.05$).

Conclusion(s): Hypofractionated stereotactic RT (hSRT) achieved comparable local control to conventionally fractionated RT (CFRT) for WHO Grade I meningiomas, with no significant difference in recurrence rates between the two approaches. These findings suggest that hSRT is a safe and effective alternative to CFRT for select patients with benign meningiomas, offering shorter treatment duration without compromising disease control.