

ABSTRACT

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Resection with intraoperative cesium-131 brachytherapy as salvage therapy for recurrent brain tumors.

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OBJECTIVE: The authors' objective was to examine the safety and efficacy of salvage intracranial cesium-131 brachytherapy in combination with resection of recurrent brain tumors.

METHODS: The authors conducted a retrospective chart review of consecutive patients treated with intraoperative intracranial cesium-131 brachytherapy at a single institution. Permanent suture-stranded cesium-131 seeds were implanted in the resection cavity after maximal safe tumor resection. The primary outcomes of interest were local, locoregional (within 1 cm), and intracranial control, as well as rates of overall survival (OS), neurological death, symptomatic adverse radiation effects (AREs), and surgical complication rate graded according to Common Terminology Criteria for Adverse Events version 5.0.

RESULTS: Between 2016 and 2020, 36 patients received 40 consecutive cesium-131 implants for 42 recurrent brain tumors and received imaging follow-up for a median (interquartile range [IQR]) of 17.0 (12.7-25.9) months. Twenty patients (55.6%) with 22 implants were treated for recurrent brain metastasis, 12 patients (33.3%) with 16 implants were treated for recurrent atypical (n = 7) or anaplastic (n = 5) meningioma, and 4 patients (11.1%) were treated for other recurrent primary brain neoplasms. All except 1 tumor (97.6%) had received prior radiotherapy, including 20 (47.6%) that underwent 2 or more prior radiotherapy treatments and 23 (54.8%) that underwent prior resection. The median (IQR) tumor size was 3.0 (2.3-3.7) cm, and 17 lesions (40.5%) had radiographic evidence of ARE prior to salvage therapy. Actuarial 1-year local/locoregional/intracranial control rates for the whole cohort and patients with metastases and meningiomas were 91.6%/83.4%/47.9%, 88.8%/84.4%/45.4%, and 100%/83.9%/46.4%, respectively. No cases of local recurrence of any histology (0 of 27) occurred after gross-total resection (p = 0.012, log-rank test). The 1-year OS rates for the whole cohort and patients with metastases and meningiomas were 82.7%, 79.1%, and 91.7%, respectively, and the median (IQR) survival of all patients was 26.7 (15.6-36.4) months. Seven patients (19.4%) experienced neurological death from progressive intracranial disease (7 of 14 total deaths [50%]), 5 (13.9%) of whom died of leptomeningeal disease. Symptomatic AREs were observed in 9.5% of resection cavities (n = 4), of which 1 (2.4%) was grade 3 in severity. The surgical complication rate was 16.7% (n = 7); 4 (9.5%) of these patients had grade 3 or higher complications, including 1 patient (2.4%) who died perioperatively.

CONCLUSIONS: Cesium-131 brachytherapy resulted in good local control and

acceptable rates of symptomatic AEs and surgical complications in this heavily pretreated cohort, and it may be a reasonable salvage adjuvant treatment for this patient population.

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