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Patterns of failure after stereotactic radiotherapy of intracranial meningioma.

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The aim of this work is to evaluate patterns of failure in patients with recurrent meningioma after stereotactic radiotherapy. Of 411 patients with intracranial meningioma treated with radiotherapy at our institution, 22 patients with local tumor progression diagnosed by magnetic resonance imaging (MRI) after radiotherapy (RT) were identified and further investigated. The histologic grade of the meningiomas was World Health Organization (WHO) grade I in 54.5%, WHO grade II in 27.3%, and WHO grade III in 9.1% of cases. Fourteen patients had received fractionated stereotactic RT; five patients underwent intensity-modulated RT. The median total dose was 57.6 Gy at 1.8 Gy/fraction, five times weekly. Local recurrences were divided into the dosimetric categories "central" ("in-field") and "marginal" ("out-field"). Median follow-up was 59.5 months. Eleven local failures were found to be central, and 11 were marginal. Recurrence-free survival ($P < 0.05$) and site of local recurrence ($P < 0.05$) depended statistically significantly on histology. Median recurrence-free survival was 46 months for patients with benign meningioma (WHO grade I) and 31.5 months for patients with higher-grade meningioma (WHO grade II/III). In the WHO grade I group, three recurrences were central and nine were marginal, whereas in the WHO grade II/III group seven recurrences were central and one was marginal. Median time to local tumor progression and site of local recurrence significantly depended on histological grade of meningioma. Regarding site of failure, improvement of dose coverage for benign meningiomas and dose escalation for high-grade tumors might further improve therapy outcome.

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