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Clinical Studies

Long-Term Recurrence Rates of Atypical Meningiomas After Gross Total Resection With or Without Postoperative Adjuvant Radiation

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Abstract

OBJECTIVE: Atypical meningioma (AM) patients often undergo gross total resection (GTR) at the time of presentation, but subsequent prognosis and optimal management remain unclear. We sought to define the long-term recurrence rate of AMs after GTR, along with factors predicting recurrence, including postoperative radiation.

METHODS: We performed a retrospective review of 108 AMs after GTR at our institution from 1993 to 2004. Recurrence risk factors were analyzed using multivariate Cox regression.

RESULTS: There were 600 patient-years of imaging follow-up on 48 men and 60 women. Of 108 tumors, 30 (28%) recurred 3 to 144 months after GTR (mean, 36 months). Actuarial tumor recurrence rates were 7% (1 year), 41% (5 years), and 48% (10 years). Of 108 patients, 8 received postoperative radiation without recurrence ($P = 0.1$). Multivariate analysis including age, sex, postoperative radiation, tumor location, MIB-1 labeling index, and 6 atypical-defining histological features identified recurrence-predicting factors: older age (hazard ratio, 1.6/decade; $P = 0.01$), sheeting (hazard ratio, 2.2; $P = 0.025$), and prominent nucleoli (hazard ratio, 2.1; $P = 0.034$). Recursive partitioning identified a subset, men with mitoses and prominent nucleoli, with 70% recurrence ($n = 14$). All patients with recurrences received radiation, and 22 of 30 patients underwent craniotomies (average, 2.7 craniotomies per patient with recurrence; range, 1-7 craniotomies). Only 1 of 22 re-resected meningiomas underwent malignant transformation. Of 30 patients with recurrence, 10 experienced tumor-induced mortality an average of 7 years after recurrence (range, 1-14 years).

CONCLUSION: After GTR without postoperative radiation, AMs have a high recurrence rate. Most recurrences occurred within 5 years after resection. Recurrences caused numerous reoperations per patient and shortened survival. Our finding suggesting lower recurrence rates in patients undergoing immediate postoperative radiation should be investigated in larger, prospective series.

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