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Bone involvement predicts poor outcome in atypical meningioma.

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Object The authors identified clinical features associated with progression and death in atypical meningioma (AM). **Methods** Forty-seven cases of primary AM treated at Massachusetts General Hospital were retrospectively evaluated for clinical features. Associations with progression-free survival (PFS) and overall survival were assessed. **Results** The estimated median PFS was 56 months (95% CI 35 months-not estimable). The overall 3- and 5-year PFS rates were 65% (95% CI 44-80%) and 48% (95% CI 26-67%), respectively. The median survival time and 5- and 10-year survival rates were 158 months (95% CI 103 months-not estimable), and 86% (95% CI 69-94%) and 61% (95% CI 35-79%), respectively. Subtotal resection was associated with increased rate of progression compared to gross-total resection ($p = 0.05$) and trended toward an association with decreased survival ($p = 0.09$). Bone involvement was associated with an increased rate of disease progression ($p = 0.001$) and decreased survival ($p = 0.04$). Bone involvement remained significantly associated with progression after Bonferroni adjustment for multiple comparisons ($p = 0.008$) and in bivariate Cox regression models. Seventy-eight percent of patients with bone involvement at primary diagnosis had tumor recurrence within bone, whereas only 25% of patients without evidence of bone invasion at primary diagnosis experienced osseous recurrence. **Conclusions** Osseous involvement is associated with a poor outcome in patients with AMs; bone assessment is therefore extremely important. Further investigation is warranted to assess the effectiveness of bone resection and/or bone-directed radiation therapy in improving outcome.

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