Recurrence of benign meningiomas: predictive value of proliferative index, BCL2, p53, hormonal receptors and HER2 expression.

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Abstract
Introduction. The biological behaviour of meningiomas and the risk of recurrence in individual cases cannot be predicted by using conventional histological criteria alone. A number of histologically benign meningiomas may recur, even after gross complete surgical removal. Material and methods. A retrospective immunohistochemical and statistical analysis of 60 patients with benign intracranial meningiomas (that have been grossly totally resected) was undertaken to determine the correlation of clinicopathological characteristics and expression of biological markers (proliferation index (PI) assessed by Ki67, hormonal receptors, p53, BCL2 and HER2, estrogen receptors, ER and progesterone receptors, PR) with prediction of recurrence. Results. HER2 expression showed a significant inverse correlation with PR and a significant direct correlation with PI. PR-negative and HER2-positive cases showed a statistically significant higher mean PI than PR positive and HER2-negative cases. Univariate analysis showed that recurrence was significantly associated with male gender, cranial base location, the presence of bone and soft tissue invasion, some atypical histological features, higher PI, negative PR expression, and positive p53, BCL2 and HER2 expression. Multivariate analysis showed that the presence of bone and soft tissue invasion and/or the expression of p53 proved to be independent predictors of tumour recurrence. The presence of some atypical histological features and high PI were significant predictors of tumor recurrence, however, they were statistically excluded to avoid multicollinearity. Conclusions. Risk stratification based on histomorphology alone remains problematic. We conclude that soft tissue and bone invasion, some atypical histological features, p53 expression and high PI identify meningiomas with benign histological features but unfavourable clinical outcome. We suggest that those patients should be followed more closely for evidence of recurrent tumour or may be treated more aggressively at the time of diagnosis.

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