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Recurrence of atypical and anaplastic intracranial Meningiomas: A meta-analysis of risk factors

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Abstract

Background: The predictive role of multiple risk factors for intracranial atypical and anaplastic meningioma recurrence is convoluted. This meta-analysis assessed the predictive value of selected factors for recurrence in these Meningiomas.

Methods: Studies encompassing risk factor data including gross total resection (GTR), subtotal resection (STR), post-op radiotherapy, Ki-67 % index >3 %, and location were searched for in PubMed, Embase, and Web of Science, and thereafter analyzed using robust Bayesian meta-analysis.

Results: Eighteen observational studies involving 1589 patients met inclusion criteria for analysis. GTR was identified as a good prognostic factor for recurrence (OR = 0.212; 95 % CI (-1.972, -1.002); heterogeneity BF=0.702), and STR had a significantly higher risk of recurrence (OR = 4.43; 95 % CI 0.658-2.011; heterogeneity BF=0.724). Post-operative radiotherapy did not statistically significantly affect the recurrence process (OR = 1.02; 95 % CI (-1.848, 0.626); heterogeneity (BF=1.034)). Ki67 % index >3 % had an augmented chance of recurrence (OR = 2.38; 95 % CI (-0.220, 2.355); heterogeneity (BF=1.162)). A meta-regression analysis showed that WHO grade III Meningiomas had a higher chance of recurring than grade II Meningiomas.

Conclusion: Among the selected factors, STR and Ki67 % index > 3 % were associated with a higher risk of recurrence, with post-operative radiotherapy making no difference. GTR appeared to inversely impact recurrence. Compared to grade II, grade III Meningiomas had higher odds of recurring.

Keywords: Anaplastic Meningiomas; Atypical Meningiomas; Meta-analysis; Recurrence; Risk factors.