CORRESPONDENCE OF TUMOR LOCALIZATION WITH TUMOR RECURRENCE AND CYTOGENETIC PROGRESSION IN MENINGIOMAS.

CLINICAL STUDIES


Abstract:
OBJECTIVE: Meningiomas are mostly benign tumors that originate from the coverings of the brain and spinal cord. Cytogenetically, they reveal a normal karyotype or, typically, monosomy of chromosome 22. Progression of meningiomas is associated with a non-random pattern of secondary losses of other autosomes. Deletion of the short arm of one chromosome 1 is a decisive step to anaplastic growth in meningiomas.

METHODS: Statistical analyses were performed for the karyotypes of 661 meningiomas with respect to localization, progression, and recurrence of the tumor. A mathematical mixture model estimates typical pathogenetic routes in terms of the accumulation of somatic chromosome changes in tumor cells. The model generates a genetic progression score (GPS) that estimates the prognosis as related to the cytogenetic properties of a given tumor.

RESULTS: In 53 patients, one or several recurrences were documented over the period of observation. This corresponds to a total rate of recurrence of 8.0% after macroscopically complete tumor extirpation. Higher GPS values were shown to be strongly correlated with tumor recurrence (P = 2.9 x 10-7). High-risk tumors, both in terms of histology and cytogenetics, are localized much more frequently at the brain surface than at the cranial base (P = 1.2 x 10-5 for World Health Organization grade and P = 3.3 x 10-12 for GPS categorization).

CONCLUSION: The tendency of cranial base meningiomas to recur seems to depend on surgical rather than biological reasons. As a quantitative measure, the GPS allows for a more precise assessment of the prognosis of meningiomas than the established categorical cytogenetic markers.

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