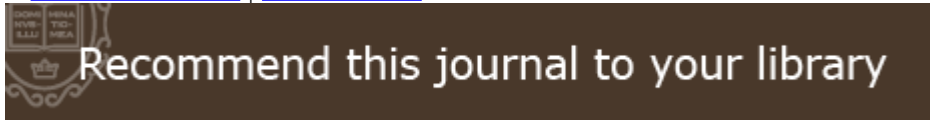


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ARTICLES

Atopy and Risk of Brain Tumors: A Meta-analysis

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Background: Glioma is a rapidly progressive disease, and little is known about its etiology. Atopic diseases are on the rise in western populations, with increasing interest on their long-term health consequences. An inverse association between atopy and the risk of glioma has been observed. We carried out a meta-analysis of studies examining the association between atopic disease and risk of glioma and meningioma.

Methods: In an electronic literature search of the MEDLINE, ISI Web of Science, and EMBASE databases from 1979 through February 2007, we identified case-control and cohort studies quantifying associations between a history of asthma, eczema, or hay fever or allergy and a medically confirmed diagnosis of glioma or meningioma. We performed meta-analysis by pooling studies according to the inverse of their variances. We evaluated publication bias using funnel plot and sensitivity analyses.

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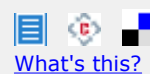
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Results: A total of eight observational studies were included, with a total of 3450 patients diagnosed with glioma and 1070 patients with meningioma. A history of atopic disease was inversely related to risk of glioma. The pooled relative risks (RRs) of glioma comparing those with a history of an atopic condition with those with no history of that condition were 0.61 (95% confidence interval [CI] = 0.55 to 0.67) for allergy, 0.68 (95% CI = 0.58 to 0.80) for asthma, and 0.69 (95% CI = 0.58 to 0.82) for eczema. Proxy reporting was unlikely to explain the association because the pooled relative risk estimate from studies without proxy reporting remained inverse and statistically significant (RR = 0.66, 95% CI = 0.58 to 0.75). Publication bias was also an unlikely explanation for the inverse association because the association persisted in a sensitivity analysis and the funnel plot was symmetric. No overall statistically significant association was noted for atopy and meningioma, although the information on this disease was limited and heterogeneous.

Conclusions: We observed a strong inverse relationship between atopic disease and glioma that is unlikely to be explained by methodologic bias alone.

CONTEXT AND CAVEATS

Prior knowledge

An association between atopic disease and a reduced risk of glioma has been observed in epidemiologic studies. No clear association with meningioma has been observed.

Study design

Meta-analysis of case-control and cohort studies of the association between a history of asthma, eczema, or hay fever or allergy and a diagnosis of glioma and meningioma.

Contributions

Eight observational studies involving 3450 patients diagnosed with glioma and 1070 with meningioma were included. Individuals with a history of an atopic condition had a 30%–40% lower relative risk of glioma than those with no such history. No association with meningioma was observed.

Implications

If the association is causal, it could reflect an effect of heightened immune surveillance on brain tumor development.

Limitations

Most of the data came from case-control studies, which may not provide as clear information on the association between exposure and disease as cohort studies. Most studies used self-reported measures of atopy, which are subject to error. Complete information on the relative timing of the atopic condition and the diagnosis of brain tumors was not available.

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