Research Article

Occupational Exposure to Extremely Low-Frequency Magnetic Fields and Brain Tumor Risks in the INTEROCC Study

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Abstract

Background: Occupational exposure to extremely low-frequency magnetic fields (ELF) is a suspected risk factor for brain tumors, however the literature is inconsistent. Few studies have assessed whether ELF in different time windows of exposure may be associated with specific histologic types of brain tumors. This study examines the association between ELF and brain tumors in the large-scale INTEROCC study.

Methods: Cases of adult primary glioma and meningioma were recruited in seven countries (Australia, Canada, France, Germany, Israel, New Zealand, and the United Kingdom) between 2000 and 2004. Estimates of mean workday ELF exposure based on a job exposure matrix were assigned. Estimates of cumulative exposure, average exposure, maximum exposure, and exposure duration were calculated for the lifetime, and 1 to 4, 5 to 9, and 10+ years before the diagnosis/reference date.

Results: There were 3,761 included brain tumor cases (1,939 glioma and 1,822 meningioma) and 5,404 population controls. There was no association between lifetime cumulative ELF exposure and glioma or meningioma risk. However, there were positive associations between cumulative ELF 1 to 4 years before the diagnosis/reference date and glioma [odds ratio (OR) $\geq$ 90th percentile vs. < 25th percentile, 1.67; 95% confidence interval (CI), 1.36–2.07; $P_{Linear\ trend}$ < 0.0001], and, somewhat weaker associations with meningioma (OR $\geq$ 90th percentile vs. < 25th percentile, 1.23; 95% CI, 0.97–1.57; $P_{Linear\ trend}$ = 0.02).