

Chapter 14

Epidemiology of Brain Tumors

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Abstract

Gliomas account for more than 70% of all brain tumors, and of these, glioblastoma is the most frequent and malignant histologic type (World Health Organization [WHO] grade IV). There is a tendency toward a higher incidence of gliomas in highly developed, industrialized countries. Some reports indicate that Caucasians have a higher incidence than African or Asian populations. With the exception of pilocytic astrocytomas (WHO grade I), the prognosis of glioma patients is still poor. Fewer than 3% of glioblastoma patients are still alive at 5 years after diagnosis, older age being the most significant and consistent prognostic factor of poorer outcome. Gliomas are components of several inherited tumor syndromes, but the prevalence of these syndromes is very low. Many environmental and lifestyle factors including several occupations, environmental carcinogens, and diet have been reported to be associated with an elevated glioma risk, but the only factor unequivocally associated with an increased risk is therapeutic X-irradiation. In particular, children treated with X-irradiation for acute lymphoblastic leukemia show a significantly elevated risk of developing gliomas and primitive neuroectodermal tumors, often within 10 years after therapy. Significant correlation between G:C→A:T transitions in the *TP53* gene and promoter methylation of the *O6*-methylguanine-DNA methyltransferase (MGMT) gene in gliomas have been reported in several studies, suggesting the possible involvement of *O*⁶-methylguanine DNA adducts, which may be produced by exogenous or endogenous alkylating agents in the development of gliomas.

Key words: Glioma, incidence, survival, occupation, *N*-nitroso compounds, cellular phone, hereditary syndrome, *TP53* mutations.

1. Incidence

The age-adjusted incidence rates of brain tumors tend to be highest in developed, industrial countries (1, 2). In Western Europe, North America, and Australia, there are about 6–11 new cases of primary intracranial tumors (including meningiomas) per