

*Medical Progress***BRAIN TUMORS**

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THE term “brain tumor” refers to a collection of neoplasms, each with its own biology, prognosis, and treatment; these tumors are better identified as “intracranial neoplasms,” since some do not arise from brain tissue (e.g., meningiomas and lymphomas) (Table 1). However, for most intracranial tumors, the clinical presentation, diagnostic approach, and initial treatment are similar. This article will focus on general presentation, diagnosis, and specific treatment.

EPIDEMIOLOGY

The American Cancer Society estimates that 16,800 new intracranial tumors were diagnosed in 1999, more than double the number of diagnosed cases of Hodgkin's disease and over half the number of cases of melanoma.² In 1999, primary cancer of the central nervous system was the cause of death in approximately 13,100 people. Metastases to the brain from a systemic primary cancer are even more common; one estimate suggests that more than 100,000 patients per year die with symptomatic intracranial metastases.³

For the period from 1950 to 1989, the age- and sex-adjusted incidence of primary tumors of the central nervous system at the Mayo Clinic was 19.1 per 100,000 persons per year (11.8 per 100,000 for symptomatic tumors and 7.3 per 100,000 for asymptomatic tumors).⁴ This incidence is almost identical to that found in the Central Brain Tumor Registry of the United States, in which the annual rate was 11.47 per 100,000 persons.⁵ Although data from the Florida Cancer Registry and other registries showed a significant increase in the incidence of malignant gliomas and central nervous system lymphomas in the elderly during the 1980s, other reports showed little or no change.^{6,7} These differences can be attributed to ascertainment bias and to improvements in the management of common illnesses, which result in longer survival and the subsequent emergence of brain tumors that would not have been evident had the patient died at an earlier age of more common problems.⁸

Ionizing radiation is the only unequivocal risk factor that has been identified for glial and meningeal neoplasms. Irradiation of the cranium, even at low

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TABLE 1. HISTOLOGIC CLASSIFICATION OF TUMORS OF THE CENTRAL NERVOUS SYSTEM.***Tumors of neuroepithelial tissue**

Astrocytic tumors
Astrocytoma
Anaplastic astrocytoma
Glioblastoma multiforme
Pilocytic astrocytoma
Pleomorphic xanthoastrocytoma
Subependymal giant-cell astrocytoma
Oligodendroglial tumors
Oligodendroglioma
Anaplastic oligodendroglioma
Mixed gliomas
Oligoastrocytoma
Anaplastic oligoastrocytoma
Ependymal tumors
Ependymoma
Anaplastic ependymoma
Myxopapillary ependymoma
Subependymoma
Choroid-plexus tumors
Choroid-plexus papilloma
Choroid-plexus carcinoma
Neuronal and mixed neuronal–glial tumors
Gangliocytoma
Dysembryoplastic neuroepithelial tumor
Ganglioglioma
Anaplastic ganglioglioma
Central neurocytoma
Pineal parenchymal tumors
Pineocytoma
Pineoblastoma
Embryonal tumors
Medulloblastoma
Primitive neuroectodermal tumor

Meningeal tumors

Meningioma
Hemangiopericytoma
Melanocytic tumor
Hemangioblastoma

Primary central nervous system lymphomas**Germ-cell tumors**

Germinoma
Embryonal carcinoma
Yolk-sac tumor (endodermal-sinus tumor)
Choriocarcinoma
Teratoma
Mixed-germ-cell tumors

Tumors of the sellar region

Pituitary adenoma
Pituitary carcinoma
Craniopharyngioma

Metastatic tumors

*This table has been abridged and modified from the World Health Organization classification.¹

doses, can increase the incidence of meningiomas by a factor of 10 and the incidence of glial tumors by a factor of 3 to 7,^{9,10} with a latency period of 10 years to more than 20 years after exposure. No other environmental exposure or behavior has been clearly identified as a risk factor. The use of cellular telephones, exposure to high-tension wires, the use of hair dyes, head trauma, and dietary exposure to *N*-nitro-