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Types, Symptoms and Treatment for Brain Tumors

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Editorial

The term "brain tumour" refers to a group of neoplasms, each with its own biology, prognosis, and treatment; these tumours are more accurately referred to as "intracranial neoplasms," because some do not arise from brain tissue (e.g., meningiomas and lymphomas). However, the clinical presentation, diagnostic approach, and initial treatment of most intracranial tumours are similar. The term "brain tumour" refers to a group of neoplasms, each with its own biology, prognosis, and treatment; these tumours are more accurately referred to as "intracranial neoplasms," because some do not arise from brain tissue (e.g., meningiomas and lymphomas). However, the clinical presentation, diagnostic approach, and initial treatment of most intracranial tumours are similar.

This article will concentrate on the general presentation, diagnosis, and treatment options. Infiltrating gliomas and lymphomas typically invade directly, whereas meningiomas and metastases displace brain tissue. The tumor's disruption of the blood-brain barrier causes vasogenic edoema, which is likely one of the primary causes of clinical impairment. Edema promotes increased mass effect and, as a result, further compression of the surrounding brain [1-3].

Primary symptoms

Headache: Although headache is commonly thought to be the "first sign" of a brain tumour, it is relatively uncommon as the only presenting complaint in patients with tumour. The posterior fossa location and hydrocephalus were more common in those who presented with headache as the first symptom. The prevalence of primary tumour versus metastatic tumour among headache sufferers was 60% and 40%, respectively, with no statistically significant difference in prevalence between any histopathologic diagnostic groups [2,3].

Nausea and vomiting: When the chemotactic trigger zone in the area postrema, which is located on the floor of the fourth ventricle, is stimulated, nausea and vomiting occur. Vomiting is usually caused by increased intracranial pressure, but it can also be caused by direct compression of the vomiting centre by posterior fossa tumours such as medulloblastomas or fourth ventricle ependymomas. It can also occur in the absence of elevated intracranial pressure in brainstem tumours involving the nucleus solitarius.

Papilledema: Papilledema is a sign of increased intracranial pressure; it is now uncommon in patients who present with a brain tumour. This is because modern neuroimaging is widely available, and it is almost always performed before the tumour progresses far enough to cause papilledema. It may not cause a change in visual acuity in its mildest form or in acute cases; enlargement of the blind spot may be the only finding on examination. Papilledema, like headache, is more common in children and young adults; this is likely because older adults have more room for tumour expansion due to brain atrophy, or because in older adults, optic nerve sheath fibrosis prevents pressure from being transmitted to the disc [4,5].

Seizure: Seizures are a common symptom of brain tumour patients. The incidence varies between 30% and 100% depending on the type of tumour, with slow-growing tumours being the most epileptogenic. Low-grade tumours may be more resistant to treatment than higher-grade lesions. Seizures that occur late in the clinical course are usually more responsive to treatment than seizures that occur early in the course. Seizures that are initially controlled but reappear when the tumour recurs are relatively resistant to treatment.

Types of brain tumor

Glial tumors: Glial tumours are classified into two types: astrocytic and oligodendroglial. Both can be of either low or high quality. High-grade (malignant) glial neoplasms can develop independently (primary glioblastoma) or from a preexisting low-grade tumour (secondary glioblastoma); in secondary glioblastoma, the low-grade tumour may be directly adjacent to the highly malignant disease.

Astrocytic tumors: Low-grade fibrillary astrocytoma must be distinguished from its more benign cousins, pilocytic astrocytoma and pleomorphic xanthoastrocytoma. Astrocytomas are tumours that develop in adolescence, with a peak incidence in the third to fourth decade of life. A seizure is typically the first clinical manifestation, which may be accompanied or followed by other neurologic symptoms or signs.

Malignant astrocytoma: The most common glial tumours are malignant astrocytomas, anaplastic astrocytoma, and glioblastoma multiforme, with an annual incidence of 3 to 4 per 100,000 population. Glioblastomas make up at least 80% of malignant gliomas. 4 Gliomas can occur anywhere in the brain, but they are most commonly found in the cerebral hemispheres. Most malignant astrocytomas are sporadic, but they can occasionally complicate genetic syndromes such as neurofibromatosis type 1 and 2, Li-Fraumeni syndrome, and Turcot's syndrome.

Oligodendroglial tumors: Oligodendrogliomas and oligoastrocytomas are tumours of oligodendrocytes or their precursors, or they have a mix of oligodendrocytic and astrocytic cells. Previously, the distinction between an oligodendroglial tumour and an astrocytic tumour had no therapeutic significance, and oligodendrogliomas accounted for approximately 5% of glial neoplasms in earlier series of tumours.

Meningioma: Meningiomas are not strictly brain tumours because they arise from meningothelial cells, which form the brain's external membranous covering. They are usually classified as brain tumours because they arise within the intracranial cavity and present with neurologic symptoms and signs. They account for approximately 20% of intracranial neoplasms and have an annual incidence of 7.8 per 100,0004; however, the vast majority are asymptomatic tumours discovered by chance at autopsy.

Treatment for brain tumor

Current therapies for malignant or high-grade gliomas rarely result in long-term tumour control. Even after aggressive combined surgery, chemotherapy, and radiotherapy, recurrence occurs between 6 and 12 months in patients with high-grade malignant brain glioma, such as glioblastoma, and between 18 and 36 months in patients with anaplastic astrocytoma [1,2].

Surgery: Glioma management is heavily reliant on surgery. Low-grade tumours should be resected to keep clinical deficits to a minimum. Both biopsy and resection are important concepts in malignant tumours, and clinical outcome is more important than surgical extent in malignant brain tumours. Tumor resection can also help to reduce the mass effect.

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Radiation therapy: Following surgery to remove as much tumour mass as possible, or if the tumour is in an inoperable region of the brain, radiation therapy can be used to kill residual tumour cells and relieve disease symptoms. Normal brain tissue can withstand up to 60 Gy of radiation per dose, which is less than the level required to kill GB cells. Conventional radiation therapy exposes patients to 180-200 cGy per dose, 5 days a week for 6 weeks, for a total of 5400-6000 cGy treatment.

Chemotherapy: Chemotherapy is now widely used in the treatment of brain tumours. Chemotherapy improves survival, particularly in patients suffering from anaplastic gliomas, oligodendrogliomas, medulloblastoma, primitive neuroectodermal tumours (PNET), germ cell tumours, and primary CNS lymphoma (PCNSL). Chemotherapy resistance is common in glioblastoma.

Gene therapy: The use of nucleic acids as drugs is referred to as gene therapy. As a result, it can change the genetic make-up of the target cells, which no other therapeutic modality can do. Gene therapy is an appealing approach to cancer treatment, and the focus of this review is on how we can harness the power of various gene therapy approaches to treat brain tumours.

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Conflict of Interest

The authors reported no potential conflict of interest.

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