

BRAIN TUMOUR AND BRAIN CANCER

Brain Tumour/Cancer

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Classifications

Brain tumours are growth of abnormal cells in the brain and its surrounding tissues. The most common type of brain tumours, known as metastatic brain tumours, is from cancer that started in another part of the body and spread to the brain. This occurs when cancer cells invade the bloodstream, become transported to the brain through the circulation and eventually form “colonies” in the brain. Some common cancers such as lung cancer, breast cancer, melanoma, and kidney cancer have higher propensity to spread to the brain. Others such as colon cancer and prostate cancer are less likely. Overall, about 20% of adult cancer patients will develop secondary brain tumours during the course of the disease.

Tumours that originate in the brain itself, that is primary brain tumours, are less common than metastatic brain tumours. These tumours can be further divided into two types, those arising directly from cells within the brain substance or those from its surrounding tissue such as from the membranes covering the brain (meninges) or from the pituitary gland, a hormone secreting gland attached to the base of the brain.

The most common group of tumours that arise directly from brain tissue is glioma. Glioma is believed to develop from nerve-supporting cells, also known as glial cells, from within the brain. The most common type of glioma is called glioblastomamultiforme, which is a fast-growing, highly malignant tumour. Their slower growing counterparts are known as astrocytoma, oligodendroglioma or a mixture of the two. These tumours, unfortunately, do tend to transform into malignant tumours with time. The causes of glial tumours remain unknown, though some genetic cancerous syndromes such as neurofibromatosis type I and Li-Fraumeni syndrome are known to associate with glioma.

The most common types of tumours that form outside the brain but within the skull are meningioma and pituitary tumours. Meningiomas are generally benign tumours but can cause neurological problems or even death due to pressure exerted onto adjacent brain tissue. They occur more common in women. It is known that radiation exposure increases the risks of developing meningioma. A rare form of genetic disorder known as neurofibromatosis type II is also associated with a high incidence of multiple meningiomas. However, for most cases, the underlying cause is unknown.

The majority of pituitary tumours are benign tumours originating from the pituitary gland. Located in the base of the skull, the pituitary gland secretes hormones that regulate a wide range of important bodily functions. The growth of the tumour can lead to compression of the normal pituitary gland causing hormonal deficiency or excessive hormone can be produced by the tumour itself leading to a variety of endocrine disorders including diabetes and infertility. Compression of the optic nerves which are adjacent to the pituitary gland can cause visual impairment or even blindness. Rarely these tumours could bleed or it could outgrow its blood supply leading to sudden deterioration of pituitary functions and visual problems. This is a medical emergency and early treatment is important.

Treatment

Metastatic brain tumours characteristically form round, circumscribed mass in the brain, making them highly feasible for surgical removal. However for small tumours, especially for those located deep inside the brain, it may be safer to control the tumour with radiation. Often after surgery, patients may need further radiation treatment to the brain especially if there is more than one tumour and this has to be determined on an individual basis.

Meningiomas develop from the meninges outside the brain substance itself and are often highly resectable. If the location of the tumour is favourable, such as just under the dome of the skull, surgery is often a cure. However, for some tumours arising from the base of the skull, surgery may become very difficult. For tumours that are not completely removable, a combined approach of surgery and radiation may provide the best solution.

The pituitary gland is located right next to a nasal sinus, known as the sphenoid sinus, deep inside the head. Some pituitary tumours may respond to drug treatment while some will require surgical removal, often by performing surgery through the nose, known as transsphenoidal surgery. For tumours that cannot be completely removed, radiation treatment may be helpful to improve disease control.

Gliomatumour cells invade the brain diffusely and irregularly and are often not completely removable and thereby not curable with surgery. The use of chemotherapy and radiotherapy therefore plays an important role, especially for malignant glioma. However, the extent of tumour resection can influence the overall patient outcome by reducing the pressure of the tumour on adjacent normal brain, reducing tumour burden so that chemotherapy and radiotherapy can work better, and thereby prolonging survival and functional independence.