

Neurosurgery Department



Brain Tumours



National
Neuroscience Institute

SingHealth

Understanding Brain Tumours

A brain tumour is an abnormal growth of cells inside the skull.

Primary brain tumours grow from the cells or blood vessels in the brain, nerves that emerge from the brain or the membranes covering the brain. They can either be benign (non-cancerous) or malignant (cancerous).

Benign tumours grow slowly and do not spread to other areas of the body. However, they can still result in severe dysfunction by exerting harmful pressure on adjacent parts of the brain.

Malignant tumours grow rapidly and invade healthy cells in the brain. They tend to spread to adjacent structures and to the spinal column through cerebrospinal fluid.

Secondary brain tumours, also known as metastatic brain tumours, are mostly malignant. They result from cancer cells that have spread from another part of the body. For example, breast, lung and colon cancers may spread to the brain via the bloodstream.

Both primary and secondary brain tumours affect brain function and the nervous system. If left unchecked, they can cause severe impairment or death.

Patients with symptoms of a possible brain tumour should consult a doctor early for diagnosis and treatment.

Signs of Brain Tumours

Depending on the type of brain tumour, symptoms may vary and present gradually.

Common symptoms include:

- Headaches that recur and get worse, especially in the morning
- Nausea and vomiting
- Seizures or fits
- Unexplained drowsiness
- Double vision, blurring or trouble seeing clearly
- Increasing difficulty with speech and hearing
- Growing weakness in the limbs
- Problems with hearing, balance and coordination
- Marked changes in memory, concentration or alertness

As some of these symptoms may be present in other conditions, consult a doctor to determine your medical condition.

Risk Factors

The cause of brain tumours is unknown. There is no clear evidence that injury, chemical exposure, viral infection, mobile phone use, environmental factors or mental stress can cause brain tumours.

Brain tumours may occur at any age.

In general, tumours that occur in childhood are different from those diagnosed in adults.

Diagnosing Brain Tumours

The doctor will take history from the patient and perform a physical examination.

Imaging tests such as the Computed Tomography (CT) scan and Magnetic Resonance Imaging (MRI) may be done.

At times, special tests like a cerebral angiogram (x-rays of the blood vessels in the brain), functional MRI scans and an MRI tractography may be needed.

These tests help to pinpoint the tumour's size and site, and how close it is to the parts of the brain that controls key functions like speech. The test results will help the neurosurgeon to plan for removal of the tumour.

Treating Brain Tumours

Treatment options depend on the type of tumour, size, location and the patient's general health. Therapy may also be given to reduce the risk of the tumour coming back.

Treatment options include:

- **Surgery**

In most cases, special techniques and instruments are used to remove as much tumour as possible with the least harm to the brain. The tumour can be entirely or partially removed, depending on its size, location and the risks involved.

A computerised navigation system is used to aid the neurosurgeon to localise the tumour and navigate critical areas of the brain during surgery.

One procedure is the awake craniotomy, performed while the patient is conscious. It reduces the risk of neurological damage for tumours located in critical brain regions.

The risks of surgery may include infection, bleeding, seizures, paralysis and coma.

- **Radiation therapy**

High-energy beams such as x-rays are used to destroy the tumour.

Radiation therapy can be external (conventional radiation) or internal (brachytherapy). For primary cancerous brain tumours that cannot be completely removed, surgery may be followed by external beam radiation over 2 to 6 weeks to destroy the remaining tumour cells.

- **Radiosurgery**

Multiple precision radiation beams are focused on a small area of the tumour to shrink it or stop it from growing. Radiosurgery is non-invasive and painless, and usually done as an outpatient procedure.

- **Chemotherapy**

Drugs are administered in pill form or intravenously to destroy tumour cells.

- **Targeted drug therapy**

Specific abnormalities within the tumour cells are destroyed by drugs to prevent cancer cells from dividing.

The treatments for brain tumours and brain cancer can be used on their own or in combination. In some cases, treatment may not be required. The tumour may simply be left alone and closely monitored.

Brain tumour treatment involves a multidisciplinary team of specialists, including neurosurgeons, neurologists, neuroradiologist, neuropathologists, oncologists, nurse clinicians and allied health professionals (therapists, social workers, psychologists, dieticians).

Side Effects of Treatment

Side effects can range from fatigue, headaches and scalp irritation for radiation therapy. Chemotherapy patients may experience nausea and hair loss, while those undergoing radiosurgery may have headaches and nausea.

Surgery for a tumour that is close to a nerve, or located in a critical or sensitive area of the brain may affect body functions such as sight, speech and movement.

Rehabilitation and Support for Brain Tumour

Recovery depends on the brain's ability to heal from damage caused by the tumour. Therapists such as physiotherapist, occupational therapist and speech therapist to support rehabilitation. If there is persistent disability, the patient may be sent to a community hospital for further neuro-rehabilitation.

During rehabilitation, the patient and family should maintain a positive attitude, set realistic goals and work steadily to accomplish each goal.

Brain Tumour Society Singapore

The Brain Tumour Society Singapore (BTSS) is a community of brain tumour patients, caregivers and survivors. The BTSS provides community support and resources such as befrienders, financial assistance and public education. Started by brain cancer survivors, BTSS meets once a month so that members can share experiences and advice on how to cope with the disease.

For more information, visit
www.braintumoursociety.org.sg

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