Brain surgery

Summary

- Conditions that require brain surgery include brain cancer, stroke and hydrocephalus.
- If left untreated, any condition requiring brain surgery can cause further damage to the brain.
- A craniotomy is an operation to open the skull in order to access the brain for surgical repair.

The brain controls and coordinates conscious and unconscious body functions, as well as 'higher' functions such as memory, learning and thinking. Like any other part of the body, it is susceptible to bleeding, infection, trauma and other forms of damage. This damage or alteration in brain function sometimes requires brain surgery (neurosurgery) to diagnose or treat these problems.

Symptoms of conditions needing brain surgery

The symptoms of conditions requiring brain surgery may vary, depending on the type and severity of the condition. General symptoms include:

- Headache
- Nausea
- Vomiting
- Drowsiness
- Seizures.

Brain conditions may require brain surgery

The main types of brain conditions that may require brain surgery include:

- **Alterations of the brain tissue** – such as brain cancer, infections and swelling (oedema)
- **Alterations in brain blood flow** – such as subdural haematoma, subarachnoid haemorrhage and intraventricular bleed
- **Alteration in cerebrospinal fluid** – such as infection or hydrocephalus.

Brain cancer

Some of the different types of brain cancer that may require brain surgery include:

- **Gliomas** – glial cells make up the supportive tissue of the brain, and don't conduct electrical impulses. Glioma is a broad term used to describe brain tumours associated with the three types of glial cell, which include the astrocyte, oligodendrocyte and the ependymal cell.
- **Pituitary tumour** – cancer of the pituitary gland, such as craniopharyngioma.
- **Acoustic neuroma or schwannoma** – a type of benign tumour that grows in the canal connecting the brain to the inner ear.
- **Medulloblastoma** – a type of cancer that originates in the brain and can migrate down the spinal cord.
- **Dysembryoplastic neuroepithelial tumour (DNET)** – an abnormal tissue growth in the brain that may or may not be cancerous.
- **Primitive neuroectodermal tumour (PNET)** – a general term referring to abnormal tissue growths of the brain.
- **Lymphomas** – cancers of the lymphatic system.
- **Chordomas** – tumours that originate in particular parts of the skeleton including the skull.
- **Metastases or secondary tumours** – metastasis means cells (usually cancer), which have moved from one

part of the body to another.

Alterations in brain blood flow

Some of the causes of altered blood flow in the brain include:

- **Subdural haematoma** – the build-up of blood beneath the thickest membrane (meninges) that covers the brain, called the dura mater. A subdural haematoma can be classified as acute, acute on chronic or chronic. The most common cause is head injury.
- **Stroke** – occurs when a blood vessel supplying the brain either blocks or bursts. A **stroke** produces sudden and unexpected brain injury and can sometimes be fatal.
- **Subarachnoid haemorrhage** – bleeding between the arachnoid membrane and the delicate membrane that covers the brain (pia mater). Common causes include head injury and **aneurysms**.
- **Intraventricular bleed** – an increase in blood flow may cause the small blood vessels of the brain (periventricular capillary network) to burst. Premature babies are at increased risk.

Alteration in cerebrospinal fluid

Some of the causes of alteration in cerebrospinal fluid include:

- **Hydrocephalus** – the abnormal build-up of cerebrospinal fluid within the skull. In babies, this can cause the head to enlarge.
- **Infection** – various infections of the brain can cause alterations to cerebrospinal fluid.

Urgent medical treatment is vital

If left untreated, any condition requiring brain surgery can cause further damage to the brain. Pressure on the brain can be harmful as it forces the brain against the skull, causing damage to the brain and hampering the brain's ability to function properly. This drop in function can lead to long-lasting brain damage and, if left untreated, death.

Diagnosis of conditions requiring brain surgery

The range of diagnostic tests can include:

- Physical examination
- Medical history
- **CT scan**
- **MRI scan**.

Craniotomy explained

A **craniotomy** is an operation to open the skull in order to access the brain for surgical repair. The patient is put under general anaesthesia. The hair on the scalp is shaved. A neurosurgeon performs the craniotomy by first cutting through the scalp over the area where the brain injury is thought to lie. A hole is then cut into the skull in order to access the brain. This is needed to repair any ruptured blood vessels and to remove the blood clot or growth.

After the operation is finished, the piece of bone that was removed is replaced, the muscle and skin are stitched up and a drain is placed inside the brain to remove any excess blood left from the surgery. Some of the possible complications following craniotomy include allergic reaction to the anaesthetic, bleeding, infection, brain damage, brain swelling, stroke and seizures.

Where to get help

- Your GP (doctor)
- **Neurologist**
- Neurosurgeon

Things to remember

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This page has been produced in consultation with and approved by:

Austin & Repatriation Medical Centre - Department of Neurosurgery