Brain Tumour Australia Information
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Treatment Options

The Brain—Treatment Options

Symptoms occur leading to a visit to a general practitioner or a hospital where a medical person will ask you questions and take a history of your symptoms.

- A neurological examination may then occur. This may include looking at your balance and coordination, tests on hearing, vision, reflexes. They will also check your memory.

CT Scanner

A Computerised Scan (CT) or a Magnetic Resonance Imaging (MRI) may then be organised. An injection of a "dye" known as "contrast" may be given. This enables obtaining a clearer image if a tumour is present.

- **A Positron emission tomography (PET)** scan may also be performed at some stage to identify the most active tumour-area prior to surgery or to differentiate a low grade from a high grade glioma (type of brain tumour).

- Depending on the type of nuclear medicine exam you are undergoing, the radiotracer is either injected into a vein, swallowed or inhaled as a gas and eventually accumulates in the organ or area of your body being examined
- Then various treatment options will be discussed with the person diagnosed with the tumour and their family or support person.
- Surgery may be an option. Most brain tumours, malignant and benign, require surgery. Your surgeon will discuss your options and the nature of the procedure.
- Do not be afraid to ask questions or seek clarification of anything that you do not understand. See **Communication with your Health Professional** For some useful ideas.
- Radiation therapy may be offered.
- Chemotherapy may also be considered.

Non-surgical Diagnostic and Monitoring tests

- **CT Scan(CAT scan):** A procedure by the use of a computer linked to an x-ray machine that takes a series of detailed pictures of areas inside the body, taken from different angles. A dye called `contrast' may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography.

- **MRI(magnetic resonance imaging):** A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of the brain and spinal cord. A substance called gadolinium is injected through a vein into the patient. The gadolinium collects around the cancer cells so they show up brighter in the picture. This procedure is also called nuclear magnetic resonance imaging (NMRI).

Surgery

The main reasons for surgical intervention when a brain tumour is diagnosed are:

- To obtain a tissue sample of the brain for an accurate pathological diagnosis
- To relieve any symptoms and improve the patients outlook by a surgical resection (removal of the tumour or parts of the tumour)
- The following terminology may be used; calling the surgical procedure a craniotomy, or debulking (removal) of the tumour or parts thereof.

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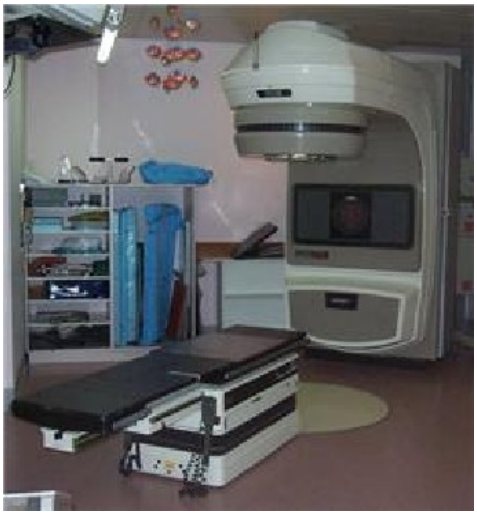
Treatment Options - Surgery & Radiotherapy

The Brain -Treatment Options

- Radiotherapy is one of the most effective treatments for brain tumours.

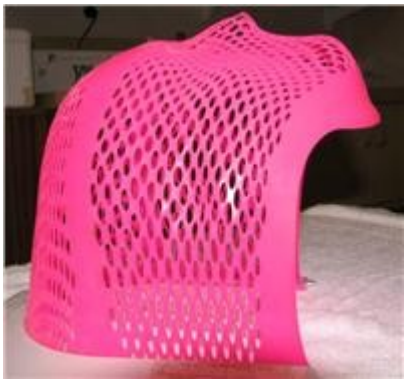


Linear Accelerator

External beam radiotherapy by a linear accelerator is most commonly used to treat brain tumours.

- The goal of radiotherapy is to accurately target tumour cells and to reduce their rate of growth.
- For some types of Brain Tumours, such as germinoma, radiotherapy can be curative.
- Its role is also central in the management of most primary brain tumours, including malignant and low-grade glioma's.
- Radiotherapy can reduce the rate of tumour progression therefore prolonging survival.
- In secondary brain metastases (from another primary site) radiotherapy may be used as a palliative Treatment to reduce symptoms and improve quality of life.
- Most tumours, including gliomas, cannot be cured by radiotherapy.
- Treatment is usually given over 25-35 doses (for gliomas) that is usually given every day, Monday through Friday, for 4-6 weeks, at an outpatient radiation oncology clinic.
- An immobilisation mask is usually fitted to ensure that the patient remains in the same position for the ray to be accurately delivered.

Immobilisation mask for Radiotherapy



- External radiation therapy does not cause your body to become radioactive.
- There is no need to avoid being with people while undergoing treatment. [You can still hold and kiss babies and be near pregnant women— concerns often raised by patients & families]

The process of receiving radiation therapy usually occurs in the following sequence:

- New patient appointment with a Consultant Radiation Oncologist
- A planning or simulation of the treatment appointment organised
- May have an appointment to have the immobilisation mask fitted correctly
- A treatment commencement date is organised

Note: Different treatment centres follow different planning timetables.

Stereotactic radiotherapy is a precise method for delivering radiotherapy by external beam.

- Radiation is delivered through either a gamma knife (a multiheaded cobalt unit) or by a particular linear accelerator that has the capacity to deliver radiotherapy in multiple arcs or beams.
- A single treatment (called a fraction) of this type of radiotherapy has been used for brain metastases or particular types of brain tumours

Interstitial radiotherapy (known as **brachytherapy**) involves implanting/inserting radiation sources directly into the tumour

Note: Both Stereotactic and interstitial radiotherapy treatments are not available at all treatment centres.

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Radiation Therapy cont. & Chemotherapy

The Brain – Radiation Therapy & Chemotherapy

Possible Side Effects of Radiotherapy

Most side effects will go away in time. However, there may be precautions and changes you may need to make, including medication adjustments, during radiation therapy. Experiencing these side effects does not indicate treatment failure.

- brain swelling
- lowered blood counts
- skin irritation (like a sunburn)
- headache
- fatigue
- hearing changes
- wax buildup in your ears
- nausea
- visual changes
- some of the same symptoms you experienced when you were first diagnosed.
- hair loss (Some of your hair may or may not grow back after treatments are finished. The amount of hair that grows back will depend on how much radiation you received. The hair may have a different texture or colour when it grows back.)

NOTE: Discuss these symptoms with your Radiation Oncologist.

Possible Delayed Side Effects

Radiation Necrosis

- Necrosis is the death of tissue surrounded by healthy tissue, and is irreversible.
- It may occur 6 months to many years (peak at 3 years) after receiving radiation therapy.
- Necrosis acts like recurrent tumour (it can mimic symptoms of a brain tumour) and looks like tumour on MRI/CT scans.
- If necrosis is suspected, special tests will be performed and treatment options discussed. Your doctor may recommend a biopsy of the area to determine if this is tumour or necrosis.

The Brain- Chemotherapy

Many different chemotherapy options are available for brain tumour patients that should be thoroughly discussed with your doctor.

- Chemotherapy agents may be either in pill or IV form.
- Chemotherapy attacks quickly dividing cancer cells.
- Chemotherapy also affects the body's other quickly dividing cells like the hair, nails, stomach, intestine lining, and blood cells.

The side effects of this may include:

- hair loss
- mouth sores
- digestive problems due to irritation of the stomach and bowel.
- Chemotherapy's impact on the blood cells can compromise the patients immune system so:
- Caregivers and patients must be careful about preventing infection (maintain a high standard personal and food hygiene, avoid contact with people with colds and other infections, avoid handling infant's nappies etc.)
- Chemotherapy patients may also need to have their blood counts checked regularly to monitor white and red cells - your doctor will organise this at the appropriate times.
- Chemotherapy patients must have their temperatures monitored to check for potential infections - check with your doctor about your particular circumstances .
- The doctor may prescribe anti-nausea medications to alleviate nausea symptoms which present at the sight and smell of food.

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Chemotherapy cont.

The Brain - Chemotherapy cont.

It's important to research and understand the side effects, which can include hair loss, vomiting, diarrhoea, constipation, loss of appetite, night sweating, weakness, and fatigue.

The question is often asked , `Why don't the doctors use more chemotherapy treatments with brain tumours?' Because of the unique, protective nature of the brain and its ability to keep `out' substances, any chemotherapy treatment needs to be able to cross over the blood brain barrier.

Blood-Brain Barrier

The brain had a specialized barrier that protected its cells. It's known that a "blood-brain barrier" keeps many substances out of the brain. The walls of the vessels that carry blood into the brain form the barrier. Who makes the brain's "A list"? Blood gases such as oxygen and small nutritional molecules are the main outsiders that can make it in.

Researchers are trying to sneak therapies past the barrier to the brain tissue by hitching therapeutic agents (particular types of chemotherapy drugs) onto molecules that already are allowed to slip through or with compounds that force open the seals. Unfortunately, many of the new therapies developed for brain ailments cannot be administered through the blood because they are barred from crossing into the brain.

The decision to use chemotherapy will be based on individual circumstances - for instance:

- Paediatric tumours (those that occur in children) are often treated with Chemotherapy as many childhood tumours are chemosensitive. (eg. medulloblastoma's and primitive neuroectodermal tumours)
- Many adult patients diagnosed with a malignant glioma may receive chemotherapy at some time during their treatment.
- Chemotherapy is also often used during tumour recurrence and some adult gliomas are also chemo sensitive. (eg oligodendroglial tumours)

For chemotherapy to be effective it must reach the tumour cells that are dividing/spreading.

This type of treatment is given orally (by mouth) or intravenously (by a cannula/needle into the arm).

Some of the drugs currently prescribed for chemo-therapy treatment are:

- Temozolomide - administered orally
- Lomustine (CCNU) - administered orally
- Carmustine (BCNU) - administered intravenously
- Procarbazine - administered orally
- Carboplatin - administered intravenously (or intra-arterially)
- Cisplatin - administered intravenously (or intra-arterially)
- Etoposide
- Vincristine - administered intravenously
- Cytarabine (ara-C)
- Methotrexate
- PVC regime (Procarbazine, Lomustine [CCNU], vincristine) OR Carmustine (BCNU) impregnated biodegradable wafers (Gliadel) applied to the surface of the surgical cavity following debulking/removal of a primary or recurrent intracranial tumour.

Metastatic Brain Tumours

The standard treatment when treating multiple brain metastasis is whole-brain radiotherapy as opposed to planned radiotherapy that directly targets the tumour. Treatment of a single brain metastasis may be surgical resection (removal) initially followed by whole-brain radiotherapy.

Chemotherapy may be utilised with whole brain radiotherapy to improve outcomes in some type of metastasis