

# Craniotomy & Excision of Brain Tumours

The currently available treatment options for brain tumours include surgery, radiosurgery, chemotherapy, radiation therapy and immunotherapy, which may be employed in different combinations depending on the type of malignant brain tumour, stage of disease and overall health.

## OPERATION

This is the treatment of choice for accessible brain tumours, which are located in areas of the brain that may be removed without great potential of neurological damage. The goals of surgery are:

- To provide tumour tissue for microscopic examination in order to reach an exact diagnosis in order to guide additional treatment
- To relieve pressure and improve neurological function
- To remove as much of the tumour as possible so there will be less of a tumour burden for adjuvant therapies.

## *Stereotactic Biopsy of Brain Tumour*

If surgical removal is not immediately feasible or if the tumour is inaccessible, that is, in an area of the brain that is deep and inoperable, then a stereotactic biopsy may be performed to establish a diagnosis. This is a minimally invasive procedure whereby computer guidance allows a probe to reach almost any area of the brain through a small hole in the skull.

A stereotactic MRI will be obtained in the 24 hours prior to surgery. The patient will then be given a general anaesthetic and a probe used in conjunction with the computer guidance system to register co-ordinates on the patient's head with the stereotactic MRI. This enables planning of the incision site, size and trajectory to be performed. A small incision will be made and a burr-hole created as planned. A biopsy needle will then be passed under live computer guidance to obtain tissue for histological diagnosis. Once this is achieved, the skin is closed with stitches and staples.

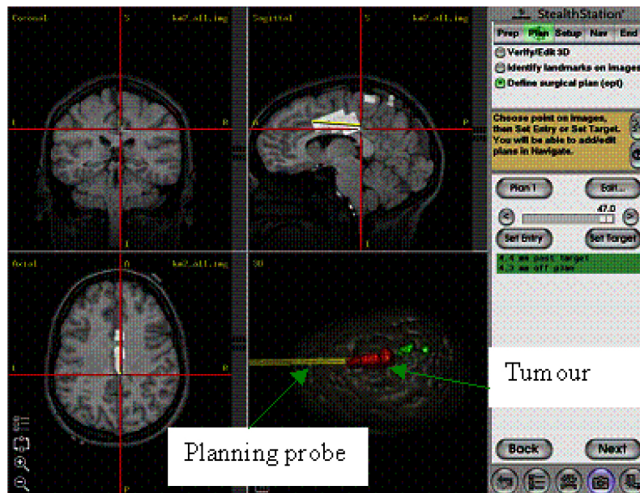
## *Craniotomy & Excision of Brain Tumour*

This will be performed usually under a general anaesthetic. A stereotactic MRI if obtained, will be registered with landmarks on the patient's head and a skin incision is made base on planning using the computer guidance system in theatre. The bone is removed (craniotomy) and the tumour removed in a 'piece-meal' fashion under direct vision. Occasionally a microscope will be used to assist in visualisation. The bone may be replaced or cement may be used to cover the opening, and the wound is then closed with stitches and staples.

## *Awake Craniotomy & Excision of Brain Tumour*

Another option is to perform brain surgery under local anaesthetic with the patient awake. This will allow intraoperative testing of specific brain function like speech and motor skills using a small stimulus probe on the brain surface. Local anaesthetic will be used liberally in the scalp to numb the scalp but there are no pain

fibres within the brain itself, allowing us to proceed with no discomfort to the patient. This is performed for tumours within eloquent region of brain (ie part of the brain that controls movement, speech) to minimize risk of neurological deficit.



Screenshot of Stereotactic surgery

## ADJUVANT THERAPY

### *Radiosurgery/Stereotactic Radiosurgery*

Stereotactic radiosurgery (SRS) is a way of treating brain disorders with a precise delivery of a single high dose of radiation in a one-day session. Treatment involves the use of focused radiation beams delivered to a specific area of the brain to treat abnormalities, tumours or other functional disorders.

### *Radiation Therapy*

Conventional radiation therapy employs external beams of X-rays or gamma rays produced by a machine called a linear accelerator or a cobalt machine aimed at the tumour or when necessary, the entire brain. Radiation therapy may be given over a period of several weeks.

### *Chemotherapy*

Chemotherapy utilizes drugs to poison and kill malignant tumour cells. There are many drugs that can destroy brain tumour cells, but each particular tumour may consist of cells with different drug sensitivities. Therefore, chemotherapy is usually administered as a combination of drugs in order to maximize the damage to the malignant tumour cells and minimize the overall toxicity to the body. Chemotherapy drugs may be administered into the veins of the body, that is intravenously, taken in pill form by mouth, or delivered directly into the central nervous system by means of implanted drug reservoirs and pumps.

Currently the first-line of treatment is surgery to obtain a tissue diagnosis and debulk, followed by combinations of radiation therapy and/or chemotherapy.

*Risks of this procedure:*

The risks of these operations include the following. A detailed discussion with your surgeon is recommended prior to surgery.

- Infection: may be superficial or deep.
- Bleeding: may be superficial bruising or a deeper collection.
- Loss of smell or cerebrospinal fluid leak through the nose if a frontal approach is required.
- Damage to the cranial nerves resulting in facial numbness, loss of vision or double vision.
- The need for a blood transfusion during or after the procedure.
- Weakness, numbness, speech disturbance or paralysis (stroke like symptoms).
- Epilepsy which may require medication.
- It may not be possible to cure this condition with surgery and further treatment may be needed.
- Coma or death.