FACT SHEET

Radiation Therapy

What is Radiation Therapy?

Radiation therapy (radiotherapy) is a type of treatment for brain tumours. It uses ionising radiation (similar to light waves and radio waves but more powerful) to destroy or damage cancer cells.

The most common type of radiotherapy is delivered by a machine called a linear accelerator. The radiation beam comes from this machine, which is external to the patient – it is therefore known as **external beam radiotherapy**. It is often given in 20 to 30 treatment sessions. Another type of radiotherapy is **stereotactic radiotherapy**. This refers to highly focused radiation treatment given to a very small tumour, less than 4 centimetres in diameter. It is usually given in just a single treatment session.

Why is Radiation Used?

The goal of radiotherapy is to cure the brain tumour or to slow the growth of the tumour when a cure is not possible. Radiotherapy is used in the following circumstances:

- to treat an inoperable tumour,
- following surgery for a brain tumour if there is a significant risk of tumour cells remaining or if the brain tumour was not completely removed;
- to relieve symptoms caused by the brain tumour.

How does Radiation Therapy Work?

Radiation therapy works because radiation (also called X-rays or photons) is able to penetrate through body tissues into the tumour, causing damage to tumour cells' DNA. Over time, the irradiated cancer cells die while attempting to regenerate. As the radiotherapy continues, an increasing number of tumour cells die and the tumour shrinks as the dead cells are broken down and disposed of.

Radiation affects both normal cells and cancer cells. However, the tumour cells are more damaged by radiation than the normal cells because:

1. Normal cells are better at repairing radiation damage.
2. By dividing the dose of radiation into small daily doses called **fractions**, normal cells are relatively spared because they are better at repairing radiation damage than the cancer cells.
3. A higher dose of radiation is delivered to the tumour cells than to the normal cells by using X-ray beams from several directions.

FACT SHEET

Radiation Therapy

The dose of radiation is measured by the amount of energy absorbed by the target. The unit of measurement is the Gray (Gy). The average x-ray used in a diagnostic procedure such as a CT scan exposes a person to about 0.000072 Gray. The amount of radiation used to treat a brain tumour is about 50 to 60 Gray.

Who gives Radiation Therapy?

Radiation therapy is administrated by specially trained therapists called **Radiation Therapists**. The treatment is usually given on an outpatient basis at the hospital by means of a machine called a **Linear Accelerator**. The decision when and how to treat a patient is made by a specialist doctor called a **Radiation Oncologist**.

How is Radiation Therapy Given?

A plastic mask is often made to keep the head still during treatment. This is followed by a planning session (called simulation) prior to proceeding with radiotherapy. This session will last between 30 minutes to 1 hour. During the simulation, the patient will have a planning CT scan to determine the correct position for treatment. Marks will be placed on the patient's mask to help set them up in the same position each day.

A typical schedule for radiotherapy consists of one treatment per day, five days a week over a 5 to 6 week period. However, other treatment schedules are also used. The treatment takes 10 to 15 minutes per day, although it is usually best to allow up to an hour.

What are the Effects of Radiation Therapy?

Radiation treatments are invisible, painless and feel no different to having a chest x-ray. Each treatment will take only a few minutes. Patients are NOT radioactive during or after radiotherapy. The radiation is active only while the machine is on. No special precautions are needed for the safety of others.

Most people receiving radiotherapy experience some form of side effects including fatigue, hair loss, skin changes, oedema (brain swelling), nausea or changes to sexual functions. These effects are short term and tend to be manageable discomforts rather than difficult or serious problems. The medication Dexamethasone can prevent or reduce some of the side-effects. Prior knowledge of these side-effects can help a patient better adjust during and after the treatment. For more detailed information on the possible side effects of radiotherapy to the brain, please see Fact Sheet called "Side effects of Brain Tumour Radiotherapy". One way to determine the response of the tumour to the radiation is by having a CT or MRI scan. An initial follow-up scan is often planned one to three months following the completion of treatment.