Pineal-region tumours

Pineal-region tumours are brain tumours that occur in the pineal region of the brain. You may also find our general information about brain tumours useful.

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The pineal region

The pineal gland is found at the back of the third ventricle of the brain (see diagram below). Ventricles are fluid-filled spaces within the brain. The functions of the pineal gland are not fully understood but one function is to produce the hormone melatonin. Melatonin is involved in regulating the body’s ‘internal clock’, which controls when we sleep and when we wake.

![Side view of the head](image)

Tumours of the pineal region

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A tumour may be either benign (non-cancerous) or malignant (cancerous). Although a benign tumour can continue to grow, the cells do not spread from the original site. In a malignant tumour, the cells can invade and destroy surrounding tissue and may spread to other parts of the brain or spine. Although this type of tumour is more common in adults, it can occur in children. For unknown reasons, it is more common in men than in women. About 4,700 people are diagnosed with brain tumours each year in the UK. About 1 in every 100 (1%) of these tumours are in the pineal region.

Types of pineal-region tumours

Pineal-region tumours can be made up of different types of cells. The most common type of tumour in the pineal region is known as a germ cell tumour. This develops from germ cells which are cells in a very early stage of development. Germ cell tumours are divided into three main groups:

- germinomas
- nongerminomatous germ cell tumours
- teratomas.

They are fast-growing and may often spread to other parts of the brain and spine.

Other types of pineal-region tumour include:

- astrocytomas
- teratomas
- meningiomas
- pineocytomas
- pineoblastomas.

Causes of pineal-region tumours

As with most brain tumours, the cause of these tumours is unknown. Research is being carried out into possible causes.

Signs and symptoms

Symptoms of tumours in the pineal region are usually due to increased pressure within the skull (raised intracranial pressure). This may be because of a blockage in the ventricles (fluid-filled spaces) of the brain, which leads to a build-up of cerebrospinal fluid (CSF). CSF is the fluid that surrounds and protects the brain and spinal cord. This increased pressure may also be caused by swelling from the tumour itself.

The first sign of this type of tumour in children is often hydrocephalus (water on the brain), which can cause enlargement of the skull. Other symptoms are likely to be headaches, vomiting (sickness) and sight problems. Children are often tired and irritable.

The tumour may cause difficulty in looking upwards, or focusing on close objects.

Symptoms may be caused by the tumour pressing on surrounding areas of the brain, such as the cerebellum. This will lead to problems with coordination and balance. People often have difficulty walking and may appear to stumble or walk awkwardly.

Germ cell tumours in the pineal region may also involve the pituitary gland and cause delayed puberty in teenagers, or other hormonal difficulties.

Tests and investigations

For your doctors to plan your treatment, they need to find out as much as possible about the type, position and size of the tumour, so you may have a number of tests and investigations.

Neurological examination (nerve tests)

You will usually have a neurological examination to assess any effect the tumour has on your nervous system.

CT (computerised tomography) scan
A CT scan takes a series of x-rays that build up a three-dimensional picture of the inside of the body. The scan is painless and takes 10-30 minutes. CT scans use small amounts of radiation, which will be very unlikely to harm you or anyone you come into contact with.

You will be given an injection of a dye, which allows particular areas to be seen more clearly. For a few minutes, this may make you feel hot all over. If you are allergic to iodine or have asthma you could have a more serious reaction to the injection, so it is important to let your doctor know beforehand.

Watch our video about having a CT scan at macmillan.org.uk/testsandscans

**MRI (magnetic resonance imaging) scan**

This test is similar to a CT scan but uses magnetism instead of x-rays to build up a detailed picture of areas of your body. Before the scan you may be asked to complete and sign a checklist. This is to make sure it’s safe for you to have an MRI scan.

Before having the scan, you’ll be asked to remove any metal belongings including jewellery. Some people are given an injection of dye into a vein in the arm. This is called a contrast medium and can help the images from the scan show up more clearly. During the test you will be asked to lie very still on a couch inside a long cylinder (tube) for about 30 minutes. It is painless but can be slightly uncomfortable, and some people feel a bit claustrophobic during the scan. It’s also noisy, but you’ll be given earplugs or headphones.

**Biopsy**

To give an exact diagnosis, a sample of cells from the tumour (biopsy) is sometimes taken, and then looked at under a microscope. The biopsy will also show if the tumour is slow- or fast-growing. The biopsy involves an operation. Your doctor will discuss whether a biopsy is necessary in your situation, and what the operation involves.

**Blood tests**

Blood tests for hormone levels will probably be taken, particularly if there are signs that the pineal gland is affected.

**Lumbar puncture**

A test called a lumbar puncture may be done. The skin on your back is numbed with local anaesthetic, and a needle is passed through the skin so that a small amount of CSF can be withdrawn for tests. The CSF is then examined, as some germinomas produce distinctive chemicals that can be detected in it.

A lumbar puncture cannot be done if there is raised intracranial pressure, so it will probably be done later on in your treatment.

**Treatment**

The treatment for tumours in the pineal region depends on a number of things, including your general health and the size and position of the tumour. The results of your tests will enable your doctor to decide on the best treatment for you.

Your treatment will usually be planned by a team of specialists known as a multidisciplinary team (MDT). The team will usually include:

- a doctor who operates on the brain and spine (neurosurgeon)
- a doctor who specialises in treating illnesses of the brain (neurologist)
- a doctor who specialises in treating brain tumours (an oncologist)
- a specialist nurse and possibly other healthcare professionals, such as a physiotherapist or dietitian.

If you have raised intracranial pressure it’s important to reduce it before treatment begins. Steroid drugs may be given to reduce swelling around the tumour. If you have raised intracranial pressure because of a build-up of CSF, a tube (shunt) may have to be inserted into the brain to drain off the excess fluid. Alternatively, a minor operation called a third ventriculostomy can create a new drainage channel.

**Consent**

Before you have any treatment, your doctor will give you full information about its aims and what it involves.
They will ask you to sign a form saying that you give your permission (consent) for the hospital staff to give you the treatment.

No medical treatment can be given without your consent.

**Benefits and disadvantages of treatment**

Treatment can be given for different reasons and the potential benefits will vary for each person. If you have been offered treatment that aims to cure your tumour, deciding whether to have the treatment may not be difficult. However, if a cure is not possible and the treatment is to control the tumour for a period of time, it may be more difficult to decide whether to go ahead.

If you feel that you can't make a decision about the treatment when it is first explained to you, you can always ask for more time to decide.

You are free to choose not to have the treatment and the staff can explain what may happen if you do not have it. Although you don't have to give a reason for not wanting to have treatment, it can be helpful to let the staff know your concerns so that they can give you the best advice.

**Surgery**

The position of the pineal region, at the centre of the brain, often makes surgical removal of these tumours very difficult.

However, where possible, surgery is the preferred form of treatment for pineal tumours. The aim of surgery is to remove as much of the tumour as possible without damaging the surrounding brain tissue.

When surgery is not the most suitable treatment, radiotherapy may be given alone, or with chemotherapy, to treat pineal tumours.

**Radiotherapy**

Radiotherapy uses high-energy x-rays to destroy the cancer cells. It is often used to treat tumours in the pineal region, especially germinomas as they respond very well to radiotherapy.

Radiotherapy is often given after surgery to destroy any remaining cancer cells. If there are signs that the cancer has spread to the spine, radiotherapy will be given to the spinal cord as well as the brain.

**Chemotherapy**

Chemotherapy is the use of anti-cancer (cytotoxic) drugs to destroy cancer cells. Chemotherapy is often used, with radiotherapy, to treat germinomas. It is rarely used for other pineal-region tumours although research is looking at ways of developing this type of treatment.

**Your feelings**

You may find the idea of a tumour affecting your brain extremely frightening. The brain controls the body and not being in control is something that can be very worrying. You may experience many different emotions including anxiety and fear. These are all normal reactions and are part of the process many people go through in trying to come to terms with their condition.

Many people find it helpful to talk about their feelings with family and friends. You may also wish to talk to your doctor or nurse, or with one of our cancer support specialists.

We have more information about the emotional effects of cancer and talking about your cancer.

**Added information**

**Driving**

In some circumstances, you may not be allowed to drive for a period of time. If you have had an epileptic fit, the Drivers and Vehicle Licensing Association (DVLA) will not allow you to drive for a year after your last fit. You can then drive again provided you remain well.

If you have surgery to the main part of the brain (the cerebrum), there is a small risk of epileptic fits and the
DVLA requires that you do not drive for a year after this type of surgery. You may not be allowed to drive some types of vehicle, such as an LGV (large goods vehicle) or a PCV (passenger carrying vehicle).

The hospital will not contact the DVLA. It is your responsibility to do so and your doctor will advise you how to go about this.

You can contact the DVLA by phone on 0300 790 6806 or at dva.gov.uk.

References and thanks

This information has been compiled using information from a number of reliable sources, including:


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Thanks to people like you

Thank you to all of the people affected by cancer who reviewed what you're reading and have helped our information to grow.

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