TUMOURS OF THE PITUITARY GLAND

A guide for patients

The pituitary gland is important because it produces hormones that are essential for the control of other glands and many of the body's functions. If a tumour grows in the pituitary, these functions can become impaired because the tumour interferes with the production of normal levels of hormones. In addition, a large tumour can press on nearby structures in the brain, disrupting their function.

Pituitary tumours can be treated with medicines, surgery and radiotherapy. Most patients with a pituitary tumour that is causing symptoms will need surgery. Current surgical techniques have been very successful in safely gaining access to the pituitary.

Modern endoscopes (thin telescopes with a light and video camera), operating microscopes and special surgical instruments allow neurosurgeons to reach the pituitary through the nose. This results in less operating time, less surgical damage, greater likelihood of surgical success and cure, fewer complications, and a quicker recovery for patients.

Some pituitary tumours still require surgery via a craniotomy (a window in the skull) like most other brain tumours.

PITUITARY HORMONES

Anterior lobe of pituitary

- ACTH (adrenocorticotropic hormone): partly regulates the adrenal glands located at the top of both kidneys to release cortisol, a chemical essential for many of the metabolic processes in the body.
- TSH (thyroid stimulating hormone, thyrotropin): partly regulates the thyroid in the production of thyroid hormone, which affects the rate of energy usage.
- HGH (human growth hormone): has a major role in growth during childhood and repair of tissues in adulthood.
- FSH and LH (follicle stimulating hormone and luteinising hormone): in women, they control ovulation and the production of oestrogen and progesterone. In men, they control development of sperm and production of testosterone.
- Prolactin: in pregnancy, prepares the breasts for milk production. After birth, controls production of breast milk.

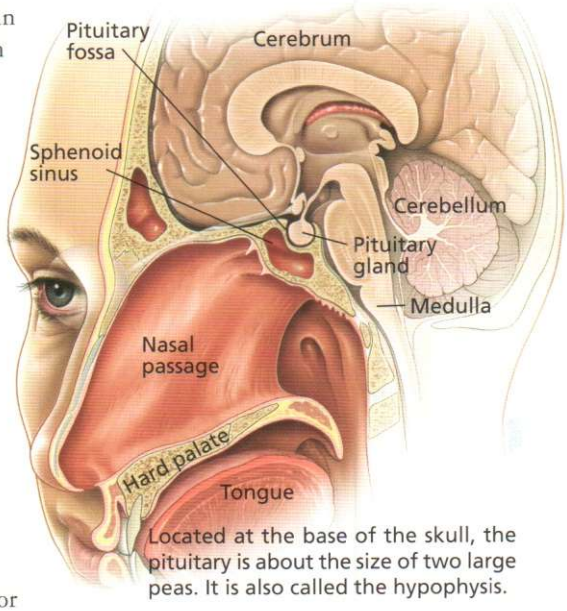
Posterior lobe of pituitary

- ADH (antidiuretic hormone or vasopressin): important in enhancing the kidneys' reabsorption of water in urine (to reduce the risk of dehydration) and maintaining the balance of water and salt in the blood and body fluids.
- Oxytocin: this hormone provokes contractions of the uterus during and after labour and the flow of milk during breast-feeding.

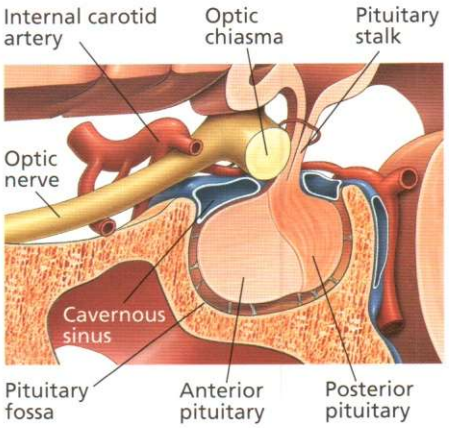
PITUITARY TUMOURS

The pituitary can give rise to different types of tumours. Doctors do not know the exact reasons why a pituitary develops disordered growth. As with most other tumours, the cause remains unknown.

Pituitary tumours tend to grow slowly and usually are non-cancerous (benign). Also called adenomas, most arise from the front (anterior) part of the pituitary. Malignant (cancerous) tumours of the pituitary are rare.



Located at the base of the skull, the pituitary is about the size of two large peas. It is also called the hypophysis.



Talk to your Surgeon

This pamphlet is intended to provide you with general information. It is not a substitute for advice from your surgeon and does not contain all the known facts about pituitary tumours. If you are not sure about the benefits, risks and limitations of treatment, ask your surgeon. Read this pamphlet carefully, and save it. Technical terms are used that may require further explanation by your surgeon. Write down questions you want to ask. Your surgeon will be pleased to answer them. Seek the opinion of another surgeon if you are uncertain about advice you are given. Use this pamphlet only in consultation with your surgeon.

Consent form: If you have surgery, your surgeon will ask you to sign a consent form. Before signing, read it carefully. If you have any questions, ask your surgeon.

Your Surgeon

IMPORTANT: Fill in all details on the sticker below.

DEAR SURGEON: When you hand this pamphlet to your patient, remove this sticker and put it on the patient's medical history or card. This will remind you and your patient that this pamphlet has been provided. Some surgeons ask their patients to sign the sticker to confirm receipt of the pamphlet.

PEEL HERE

TREATMENT INFORMATION PAMPHLET

PROCEDURE: _____

PATIENT'S NAME: _____

DOCTOR'S NAME: _____

EDITION NUMBER: _____ DATE: D D / M M / Y Y Y Y

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Surgery of the Pituitary Gland

The aim of pituitary surgery is to remove as much of the tumour as possible.

To access the pituitary, the most common surgical approach is through the main nasal passage and the sphenoid sinus.

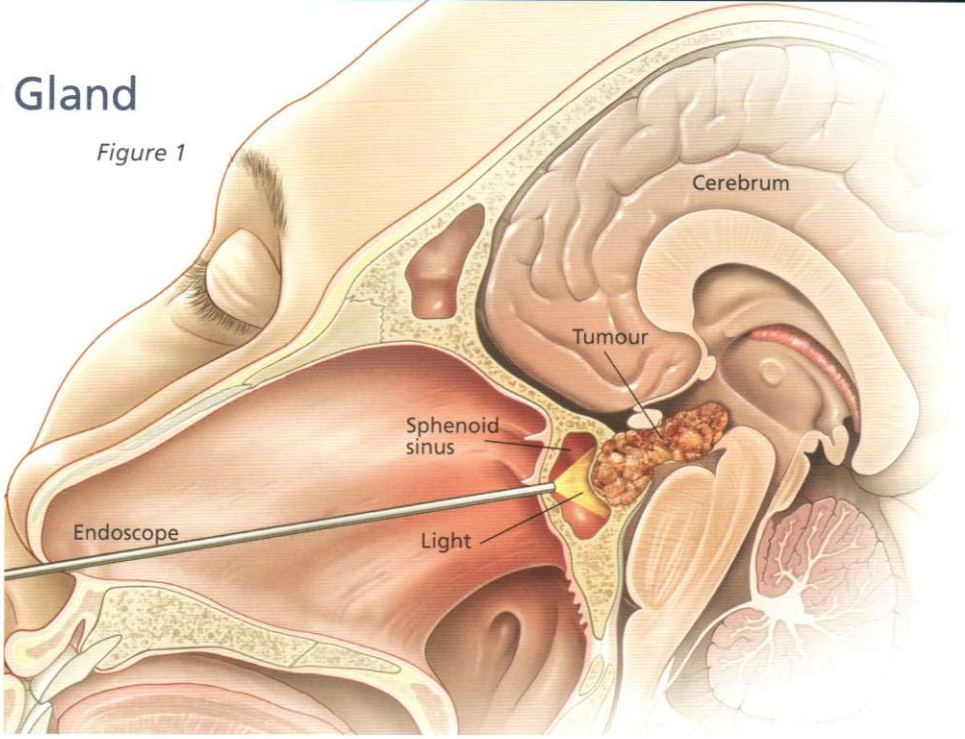
As shown in Figure 1, an endoscope is passed into the nasal passage to the sphenoid sinus. No skin incision is needed. As the endoscope provides good images, the surgeon can quickly identify the front wall of the sphenoid sinus. A hole is created in the front wall of the sinus so the surgeon can access the pituitary.

Using either the endoscope or an operating microscope, the surgeon opens the bony floor directly under the pituitary (Figure 2). Both methods provide the surgeon with good light, magnification and access.

The tumour is removed in small fragments using suction and special surgical instruments called curettes (Figure 3).

If the tumour is small, the surgeon can often remove virtually all the tumour without significant trauma to the pituitary. In larger tumours that require more surgery, the surgeon usually has to remove a significant portion of the pituitary. The surgeon tries to save as much pituitary tissue as possible. The surgeon is careful to protect blood vessels and nerves in the area.

Figure 1



At the top of the pituitary is a thin membrane that separates the gland from cerebrospinal fluid (CSF) of the brain. As this membrane is sometimes ruptured during surgery, it needs to be sealed so that CSF does not leak, posing an infection risk to the brain. To seal the hole, a small ball of fat is taken from the patient's abdomen or from the thigh and packed into the pituitary fossa as a plug (Figure 4).

Finally, the hole through the bony wall of the fossa is reconstructed, which may include bone from the patient, dissolvable plates (Figure 4), and tissue glue. The aim is to protect the pituitary and the brain, and minimise the risk of CSF leakage and infection of the CSF (meningitis).

The surgical procedure usually takes about three hours.

For some large tumours that have grown upwards into the brain, the removed to relieve most symptoms, for example, decompression of the optic nerve structures and restoration of normal or nearly normal vision.

Patients with large tumours of either type can have sudden bleeding (haemorrhage) into the tumour, known as pituitary apoplexy. This can cause serious headache, loss of vision, double vision, or failure of the pituitary.

FUNCTIONING AND NON-FUNCTIONING TUMOURS

Pituitary tumours are classified into two groups: functioning and non-functioning.

1 **Functioning (secretory) tumours:** These tumours produce an excess of one or two pituitary hormones. This can cause conditions such as:

- hyperprolactinaemia (excess of prolactin), causing irregular or absent periods in women, impotence in men, infertility in men and women, and breast-milk production in men and women. This is the most common type of pituitary tumour. Patients can often be managed by endocrinologists (physicians who treat gland and hormone disorders) without surgery using the medicines bromocriptine or cabergoline.
- acromegaly in adults and gigantism in children, caused by an excess of growth hormone.
- hyperthyroidism (excess of TSH).
- Cushing's syndrome (excess of ACTH).

The hormone produced depends on the type of cell in the pituitary that gave rise to the tumour. Functioning tumours may be discovered even when they are very small because they produce so much hormone, with resulting symptoms.

2 **Non-functioning tumours:** These do not produce hormones but cause problems because, as they grow larger, they press on the pituitary and nearby structures. This can cause:

- loss of vision when the tumour presses on the optic nerves, optic tract and optic chiasma, which lie above the pituitary. They are vulnerable because they are so close to the pituitary. Loss of peripheral vision is the most common symptom.
- hypopituitarism, which is caused by poor production of pituitary hormones.

Both functioning and non-functioning tumours can invade the tissues around the skull base, damaging the pituitary and causing a range of symptoms depending on location, including headache, double vision, tunnel vision, blindness or hydrocephalus.

In some patients, the surgeon may not be able to remove all of the tumour, due to its size, location and growth around important nerves and blood vessels. However, enough of the tumour can usually be

DIAGNOSIS

Blood tests: These can determine the blood levels of pituitary hormones, other hormones, and other factors.

Diagnostic imaging: Magnetic resonance imaging (MRI) is the investigation of choice. It provides images of the pituitary, the position and size of any tumour, and the anatomy of nearby structures. Computer tomography (CT) is sometimes helpful, particularly in imaging of the sphenoid sinus.

Eye specialist: If the patient has disruptions of vision, an eye specialist may determine which parts of the visual field are affected. This can be helpful in estimating which optic nerve structures are being compressed by the tumour.