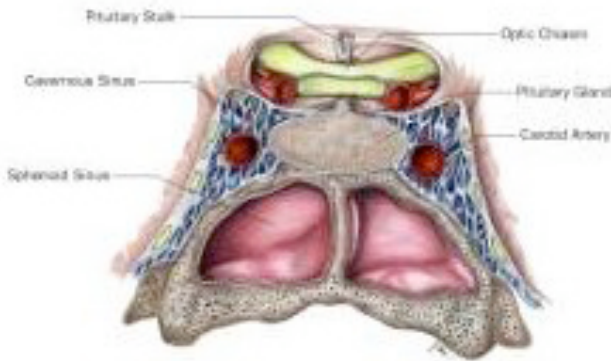




Pituitary Tumours



The pituitary gland is a small oval-shaped gland found at the base of the brain below the optic nerve, behind the bridge of the nose. It is responsible for the body's growth and metabolism by producing hormones which control and regulate the other glands in the body.

The pituitary gland is divided into two lobes, the large anterior or front lobe and the smaller posterior or back lobe. Each of these lobes produce hormones which may affect the body if secreted aberrantly.

The anterior pituitary produces six hormones:

- **growth hormone** which controls growth.
- **prolactin** which stimulates the production of breastmilk after childbirth.
- **ACTH (adrenocorticotrophic hormone)** which stimulates the production of hormones from the adrenal glands.
- **TSH (thyroid-stimulating hormone)** which stimulates the production of hormones from the thyroid gland.
- **FSH (follicle-stimulating hormone)** and **LH (leuteinising hormone)** which stimulate the ovaries of women and the testes in men.

The posterior pituitary produces:

- **ADH (anti-diuretic hormone)** which reduces the amount of urine produced by the kidneys.
- **oxytocin** which stimulates the contraction of the womb during childbirth and the production of milk for breast feeding.

Pituitary tumours make up nearly 10% of all brain tumours. They are most commonly found in young or middle-aged adults.

The majority of these tumours are benign (non-cancerous) and do not spread. They are sometimes called *adenomas*. Depending on the size of the adenoma it may be called a macro-adenoma or a micro-adenoma. Pituitary tumours are either *secreting* (producing hormones) or *non-secreting tumours* (not producing hormones). Secreting tumours release excess amounts of any of the pituitary hormones and are named after the hormone that is being over-produced, e.g. prolactin-secreting tumour.

CAUSE

The cause of pituitary tumours are unknown. Pituitary tumours usually grow slowly over a period of many years. They typically will be discovered either due to their hormone secreting effects or by displacing and slowly compressing surrounding cranial nerves.

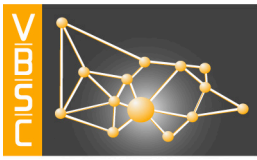
SIGNS AND SYMPTOMS

Patients with pituitary tumours may present with symptoms either by direct pressure from the tumour itself or by a change in the normal hormone levels.

Hormonal Effects

Symptoms caused by a change in hormone levels usually take a long time to develop.

- *Prolactin*-secreting tumours are the most common type of secreting tumour. Women with this type of tumour may notice that their monthly periods stop and they may also produce small amounts of breast milk. Symptoms in men may include impotence (loss of the ability to have an erection). Infertility (inability to have children) is common in both men and women and the tumour may be discovered during routine tests for infertility.
- Excess production of *growth hormones* can cause a condition called gigantism which leads to abnormal growth known as acromegaly. This causes enlargement of the hands and feet and can also lead to high blood pressure and diabetes.
- A tumour that releases too much *TSH* causes a disruption in the body's normal metabolism. However, these tumours are extremely rare.
- Over-production of *ACTH* can produce a number of symptoms including Cushing's syndrome, which is characterised by a round face (known as moon-face), weight gain, increased facial hair in women and mental changes such as depression.
- Tumours that secrete *FSH* or *LH* are very rare and are likely to cause infertility.



- Tumours in the posterior pituitary are very rare and disturbances in this area are more likely to be caused by pressure being applied to the area from the surrounding tissues. The most common symptom of a problem in the posterior pituitary is a condition called *diabetes insipidus* (not the same as the more common diabetes mellitus). The main symptom of diabetes insipidus is being very thirsty and passing large amounts of very weak urine.

Pressure Effects

As the tumour grows it puts pressure on the surrounding neural structures.

- Optic nerve: which leads to the eye and can result in loss of vision, typically tunnel-vision
- Oculomotor, trochlear & abducens nerve: which innervates the muscles of the eye. Pressure on these can result in double vision due to loss of coordinated eye movements
- Trigeminal nerve: which gives sensation to the face resulting in facial pain, tingling, numbness
- Third ventricle: which is part of the CSF flow pathway. This can result in hydrocephalus leading to headaches, nausea, vomiting and altered consciousness
- Cerebral hemispheres: This can result in seizures and other focal neurological deficits (weakness, numbness, paralysis)
- Pituitary gland: Pressure on the normal pituitary gland may result in dysfunction of the pituitary and symptoms related to lack of hormone secretion.

Pituitary Apoplexy

This is a condition which occurs due to essentially a stroke of the pituitary gland. It is characterised by sudden onset of headache, visual symptoms, altered mental status, and hormonal dysfunction. There is usually an existing pituitary adenoma associated with this condition.

INVESTIGATIONS

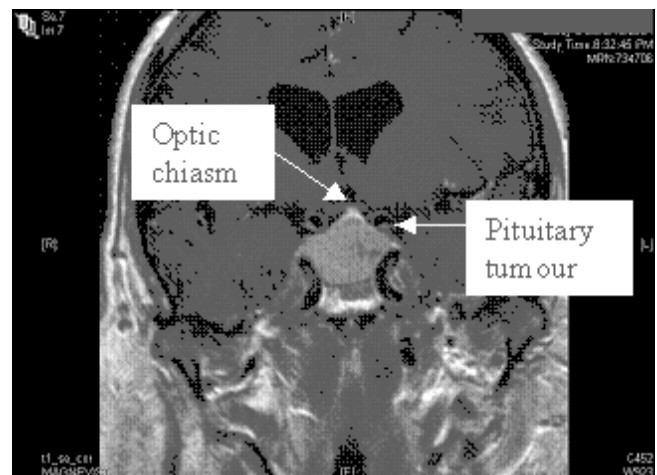
Blood tests

These include the pituitary function tests and may identify hormone secreting tumours.

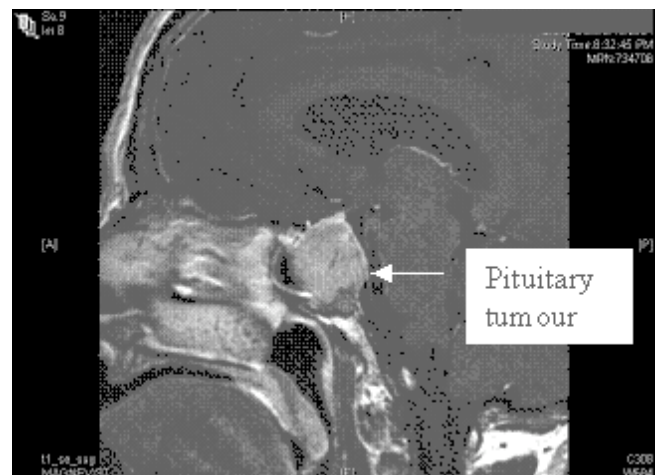
- Prolactin level – Is often elevated due to localised pressure on pituitary stalk regardless of what tumour is present
- Growth Hormone / IGF-1 (insulin-like growth factor 1)
- Thyroid Stimulating Hormone
- Early morning cortisol level.
- FSH/LH/Testosterone levels.

Radiological tests

- Skull X-Ray – this may demonstrate an enlarged pituitary fossa or show calcification in the pituitary fossa to suggest the presence of a pituitary tumour.
- CT Head - the diagnosis of a pituitary tumour is sometimes made following a routine CT of the head for another reason. These may sometimes be called incidentalomas.



Coronal MRI demonstrating pituitary tumour contacting the optic chiasm



Sagittal MRI demonstrating a pituitary macroadenoma

- MRI Head – the gold standard in diagnosis of pituitary tumours. Allows identification of tumour and gives detailed images of proximity of surrounding neural structures to assist in neurosurgery.

Visual field testing

- May be performed as first-line test for investigation of visual disturbance or as follow-up test after diagnosis of pituitary tumour for clear documentation of any visual deficit present.