

Pituitary Tumors

What You Should Know

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Where is the pituitary gland located?

The pituitary is a pea-sized gland that is connected to the brain. It is located in the center of the head, just behind the eyes, sitting on a bony structure called the sella turcica. It has anterior (front) and posterior (back) portions. The hypothalamus is part of the brain connected to the pituitary. It produces hormones that are necessary for the anterior pituitary gland to function normally. The pituitary stalk connects the hypothalamus to the pituitary gland.

What does the pituitary gland do?

The *anterior* pituitary gland secretes at least six different hormones into the bloodstream. These hormones help control other body functions.

- TSH (Thyroid Stimulating Hormone) - stimulates the thyroid gland
- ACTH (Adrenocorticotropic Hormone) - stimulates the adrenal glands
- LH and FSH (Luteinizing Hormone and Follicle Stimulating Hormone) - stimulates the gonads (ovaries and testes)
- Growth hormone - stimulates bones to grow longer in children and adolescents
- Prolactin - stimulates milk production in pregnant and nursing women

The *posterior* pituitary contains nerves extending from the hypothalamus. Through those nerve endings it releases two hormones:

- Vasopressin - controls water balance
- Oxytocin - stimulates the uterus to contract during labor

Are pituitary tumors malignant?

Very, very rarely are pituitary tumors malignant. They are generally very slow growing tumors, but they still may compress, surround, erode or invade tissues around them.

Are pituitary tumors hereditary?

These tumors are usually not hereditary. There are rare families in whom there may be a genetic disorder associated with pituitary tumors.

Do pituitary tumors produce any hormones?

Pituitary tumors usually produce hormones, but not always. Tumors in the pituitary gland may arise from any of the 5 different cell types in the anterior pituitary. Therefore they may produce different hormones such as TSH, ACTH, LH, FSH, growth hormone or prolactin. Sometimes more than one type of hormone is produced.

What are the effects of excess hormone production by pituitary tumors?

The effects depend on what specific hormones are produced in excess.

- Too much TSH will stimulate the thyroid gland and result in hyperthyroidism.
- Too much ACTH will stimulate the adrenal glands, and result in a condition called Cushing's syndrome. This causes excess fat in the torso and abdomen, weakness of the arms and legs, and other changes.
- LH and FSH produced by tumors are often not biologically active hormones. They usually have no effect on the gonads.
- Too much growth hormone will result in excessive growth of bones and soft tissues (acromegaly).
- Too much prolactin causes the breast to produce milk. It also causes loss of menstrual periods in women and erectile dysfunction in men.

What are the local effects of a tumor developing in the pituitary?

- Headaches are relatively common with any pituitary tumor, even when it is not very large.
- If the tumor grows upward it may compress the optic nerves and cause problems with vision.
- If the tumor grows sideways it may press on nerves that control eye movements.
- The expanding tumor may also compress the pituitary stalk and interfere with the function of the rest of the pituitary gland. This would result in deficiencies of the other hormones. An exception to this is prolactin, which increases when a tumor compresses the pituitary stalk.
- Sometimes a very large tumor may also affect the release of vasopressin from the posterior pituitary. This results in excessive urination and thirst (This condition is called diabetes insipidus).

How is the diagnosis of a pituitary tumor made?

When the symptoms may cause us to suspect a pituitary tumor, we will do hormonal blood tests and an MRI of the pituitary gland to confirm the diagnosis.

What is the treatment for a pituitary tumor?

Prolactin secreting tumors usually respond well to oral medications such as bromocriptine (Parlodel), pergolide (Permax) or cabergoline (Dostinex). When medications are ineffective or when these tumors are very large, surgery is often necessary.

Surgery is usually the treatment of choice for other types of pituitary tumors. The pituitary gland is located just above the sinus that lies above the back of the nose. The simplest and safest surgical approach to most pituitary tumors is through a small incision at the back of the nasal passages. This is referred to as transsphenoidal surgery. It should be performed only by a neurosurgeon who has extensive training and experience in this procedure.

Growth hormone secreting tumors are more often treated with injections of octreotide (Sandostatin; injected 2 or 3 times daily) or long acting octreotide (Sandostatin LAR; injected once a month).

Radiation therapy may also be required when a tumor cannot be completely removed with surgery. Conventional radiation therapy, which has been used for many years, works well in most cases. However there is usually a large amount of unwanted radiation exposure to other parts of the brain with this technique. Stereotactic radiation therapy, developed more recently, allows more radiation to be focused on the tumor with less radiation exposure to other structures.

The effects of the tumor, surgery, or radiation therapy may cause the pituitary to produce reduced amounts of hormones. If this is true then it is necessary to replace the missing hormones. Thyroid hormone and cortisol are available in oral tablets, estrogen is available in oral tablets or skin patches and testosterone is available in skin patches or injections. Growth hormone, used in selected situations, is available in injections.

If medications are used, how are these monitored?

Medications used to decrease the production of prolactin or growth hormone are checked by measuring the blood levels of these hormones. An MRI also allows us to evaluate whether the tumor has shrunk.

Medications used to treat decreased pituitary function are checked by measuring blood levels of the hormones that are being replaced. The doses of the medications are adjusted every month or two until the levels are where they should be and there are no more symptoms or abnormal physical findings.

If medications are used, will these need to be continued for life?

In most cases medications will need to be continued for life. However, there are exceptions. Sometimes medications are used before surgery. If the surgery is successful there may not be a need to continue medications afterwards. Tumors producing excess prolactin sometimes resolve after several years of medical management. Those that do not resolve usually require chronic, possibly lifelong, medical treatment.