

## **Pituitary Tumor**

Pituitary tumors are benign (non-cancerous) overgrowth of cells that make up the pituitary gland (the master gland that regulates other glands in the body). These tumors are very common. Tumors that grow large enough to produce symptoms are much less common but still are one of the most common tumors occurring within the head. These tumors may often be present for years without diagnosis or even symptoms.

### **Anatomy:**

The sella is a depression in the sphenoid bone that makes up part of the skull base located behind the eye sockets. The pituitary gland lies within the sella connected to the brain above (the hypothalamus) by the pituitary stalk or infundibulum. The pituitary gland sits just above the sphenoid sinus and between the cavernous sinuses containing the two carotid arteries and the nerves responsible for facial sensation and moving the eyes and eyelid). The optic nerves coming from each eye meet just above the sella in the optic chiasm.

### **Physiology:**

The pituitary gland is responsible for sending signals to the other endocrine glands throughout the body including the thyroid gland, the adrenal glands, and the sexual organs. The pituitary gland in turn is controlled by signals from the hypothalamus. An abnormal growth of cells within the pituitary gland may produce an excess of signal to the other endocrine glands leading to overproduction of thyroid, cortisone, or sex hormones. A pituitary tumor may cause damage to the remainder of the gland and result in decrease in normal pituitary function. If the pituitary tumor extends out of the sella it may produce symptoms due to compression of surrounding structures including the optic nerves, chiasm, and cranial nerves in the cavernous sinus (controlling eye movement and facial sensation).

### **Symptoms:**

Patients with pituitary tumors often have no symptoms at all. Occasionally these tumors may produce headaches. Head pain may be sudden and severe if there is a bleed into the tumor. Endocrine symptoms are most common including alterations in menstruation, lactation (milk from the breast), impotence, or loss of sex drive. Less commonly, tumors may produce growth hormone causing gigantism in young patients or enlargement of hands, feet, and facial features (acromegaly) in older patients. Rare tumors lead to secretion of excess thyroid, producing tremors, weight loss, diarrhea, and a sense of constantly feeling hot. Cushing's syndrome occurs when there is excess adrenal secretion resulting in weight redistribution from the arms and legs to the trunk, thinning of the skin, rounding of the face (chipmunk facial appearance), fatigue, and hair thinning. When the back portion of the pituitary gland is affected the patient may notice excessive thirst and urination. This is called diabetes insipidus and is unassociated with elevated blood sugar or the need for insulin. Some pituitary tumors are associated with diabetes and blood sugar should always be checked.

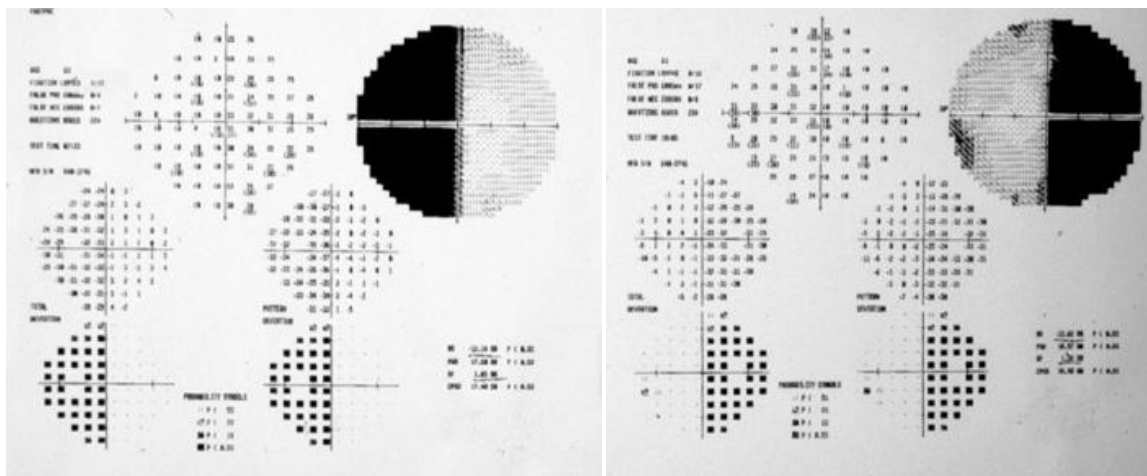
The third set of symptoms relates to damage to surrounding structures if the tumor gets large enough. The most common of these symptoms is due to compression of the optic nerves or chiasm. Patients with involvement of one optic nerve may notice dim, dark, or blurred vision. Occasionally this may come on suddenly or be noted when one happens to cover one eye and notes that they can't see out of the opposite eye. If the chiasm is affected, vision will be lost off

to the outside in both eyes. This may not be apparent unless one happens to close one eye. If the nerves surrounding the sella are affected, there may be double vision, eyelid droop, pupil enlargement, or facial pain and numbness.

**Diagnosis:**

Pituitary tumors are usually suspected based on endocrine changes but are confirmed with imaging studies. A CT scan can reveal a pituitary tumor and may be especially sensitive to hemorrhage. MRI scanning may be more sensitive and better define the relationship of the tumor to the optic nerves and surrounding structures.

Blood studies to check pituitary function are essential. Other lesions around the sella and pituitary may produce similar symptoms and may be confused with a pituitary tumor. These include meningiomas, craniopharyngiomas, germ cell tumors, and aneurysms.





#### Treatment:

Not all tumors need to be treated. Tiny adenomas picked up on scans done for other reasons that are not producing symptoms may be followed without treatment. When the patient is symptomatic, some form of treatment is usually indicated. The most common approach is surgery usually performed through the nose (or up under the lip). Occasionally (especially when the tumor is larger or extending to the side) a surgical approach may be best through a scalp incision. Some tumors may be responsive to medical therapy. These medicines are designed to mimic the normal control hormones, thus causing the cells of the tumor to shrink but not disappear. The medicine usually needs to be continued indefinitely. Some medications that may be effective in controlling the symptoms of excess tumor secretion (particularly in acromegaly) are less effective in shrinking the tumor and are commonly used in addition to surgery. With large tumors, some tumor cells are almost always left behind following surgery. As these tumors tend to grow slowly additional treatment following surgery may often be put off. If there are a lot of cells left or symptoms develop or recur, additional treatment may be needed. This may include repeat surgery or radiation therapy. Radiation may be delivered in fractionated form (small doses over several consecutive days) or with focal application (stereotactic radiosurgery via Gamma Knife or LINAC). As surgery and radiation may be accompanied by decreased pituitary function it is very important that hormone levels be checked periodically and replaced as necessary. It is also important to follow vision, visual fields, and imaging studies (MRI scan) to make sure that there is no re-growth of the tumor. These should probably be checked at least once every one to two years.