# CHANGE OF PITUITARY GLAND FUNCTION IN NEURODEGENERATE DISEASES

**Qushoqova Gulhayo Bahodir qizi**
qushoqovagulhayo@gmail.com
A student of the Termiz branch of the Tashkent Medical Academy
**Abdushokirov Fayziddin**
A student of the Termiz branch of the Tashkent Medical Academy
**Ashurova Lobor Olimjonovna**
A student of the Termiz branch of the Tashkent Medical Academy
Research advisor: **Tog‘ayev Azizbek Aliyor o‘g‘li**
azizbek200794@gmail.com
Assistant of the Department of Medical and Biological Chemistry of the Termiz Branch of the Tashkent Medical Academy

**Annotation.** Hormones that affect the functioning of all organs and systems enter the blood from special endocrine glands, which are united into a single endocrine system. These are the adrenal glands, thyroid and parathyroid glands, ovaries (in women), testes and testes (in men), pancreas, hypothalamus and pituitary gland. This article is about pituitary dysfunction, diagnosis and treatment.

**Keywords:** pituitary gland, hormones, hypothalamus, osteoporosis, gigantism, acromegaly.

**Introduction.** At the pinnacle of power is the pituitary gland, a small gland rarely larger than the size of a child's little fingernail. The pituitary gland is located in the brain (at its very center) and tightly controls the work of most endocrine glands, secreting special hormones that control the production of other hormones. For example, the pituitary gland releases thyroid-stimulating hormone (TSH) into the blood, which causes the thyroid gland to create thyroxine and triiodothyronine. Some pituitary hormones have a direct effect, for example, somatotropic hubbub (GH), which is responsible for the processes of growth and physical development of the child. A deficiency or excess of pituitary hormones inevitably leads to serious illnesses.

Lack of pituitary hormones leads to: To a secondary deficiency of hormones of other endocrine glands, for example to secondary hypothyroidism - deficiency of thyroid hormones. In addition, a lack of pituitary hormones themselves causes severe physical impairment. Thus, deficiency of somatotropic hormone (GH) in childhood leads to dwarfism.

Diabetes insipidus - with a lack of antidiuretic hormone (ADH is produced in the hypothalamus, then enters the pituitary gland, from where it is released into the blood)

Hypopituitarism - a deficiency of all pituitary hormones - can manifest itself in children as delayed sexual development, and in adults - as sexual disorders. In general, hypopituitarism leads to severe metabolic disorders that affect all body systems. An excess of pituitary hormones gives a clear clinical picture, and the manifestations of the disease differ greatly depending on which hormone or which hormones exceed the norm.

With an excess of pituitary hormones: High levels of prolactin (hyperprolactinemia) in women are manifested by menstrual irregularities, infertility, and lactation (swelling of the

mammary glands and milk secretion). In men, hyperprolactinemia leads to decreased libido and impotence.

Excess growth hormone (GH) has given the world giants. If the disease begins at an early age, gigantism occurs, if in adulthood, acromegaly occurs. According to the Guinness Book of Records, the tallest man was Robert Pershing Wadlow, born in 1918 in the USA. His height was 272 centimeters (arm span 288 centimeters). However, according to the domestic book of records Divo, the tallest in world history was Russian citizen Fedor Makhov. His height was 2 meters 85 centimeters and his weight was 182 kilograms. With acromegaly, the patient's hands and feet thicken, facial features become large, and internal organs become enlarged. This is accompanied by cardiac dysfunction and neurological disorders. Increased levels of adrenocorticotropic hormone (ACTH) lead to Cushing's disease. This serious disease is manifested by osteoporosis, high blood pressure, the development of diabetes mellitus, and mental disorders. The disease is accompanied by characteristic changes in appearance: weight loss in the legs and arms, obesity in the abdomen, shoulders, and face.

**Tumors.** Most often, disruption of the pituitary gland is associated with benign tumors - adenomas. Such tumors can be hormonally active and produce certain hormones, or hormonally inactive and produce nothing. Clinically, this pathology manifests itself differently depending on what hormones the tumor produces or does not produce at all, and also depending on the size of the tumor. A tumor can enhance the production of some pituitary hormones and suppress the synthesis of others, which leads to hormonal imbalance in the body. In some cases, the pathological process is asymptomatic, so a tumor in the pituitary gland is discovered by chance when performing an MRI or CT scan of the brain.

**Gigantism.** This disease develops when children and adolescents produce too much growth hormone. At this age, the growth zone at the ends of the bones is not yet closed, so they begin to rapidly grow in length. A person with gigantism is tall (195 centimeters and above), and the length of the limbs is increased. Following the bone tissue, muscles begin to grow. For their normal functioning, increased blood supply is required, the heart cannot cope with the increased load, and as a result, a person develops cardiovascular diseases. In addition, with gigantism, underdevelopment of the genital organs is often observed.

**Acromegaly.** The disease usually occurs in people aged 30–50 years and is associated with increased synthesis of growth hormone. At this age, such an increase no longer affects the growth of bones in length, since the growth zone is closed. Therefore, the bone tissue begins to grow in width, which leads to deformation and thickening of parts of the body, especially the limbs. Facial features become rough, the jaw becomes massive. The skin darkens and becomes rough, the size of the tongue may increase, the voice becomes hoarse, and vision decreases. As a result of an increase in the size of the heart, heart failure develops. Pathological changes develop slowly and therefore remain invisible for a long time.

**Short stature (nanism).** Occurs when there is a lack of somatotropic hormone in childhood. In women suffering from dwarfism, the height does not exceed 120 centimeters, in men - 130 centimeters.

**Itsenko-Cushing's disease.** This is a whole complex of symptoms caused by excessive synthesis of adrenocorticotropic hormone (ACTH) by the pituitary gland, which in turn stimulates increased production of glucocorticoid hormones by the adrenal glands. The main signs of this pathological condition: obesity of the upper body (the limbs remain thin), a swollen “moon-shaped” face, thin skin, decreased muscle mass, a tendency to bruise, stretch marks on

the skin. Concomitant diseases gradually develop: osteoporosis, arterial hypertension, impaired glucose tolerance and diabetes mellitus.

**Sheehan syndrome.** This is a sharp decrease in the function of the adenohypophysis in women after childbirth, which occurs as a result of necrosis of the pituitary gland. Tissue death occurs due to difficult childbirth with severe bleeding, as a result of which blood pressure drops sharply and the volume of circulating blood decreases. Lactation does not occur with Sheehan syndrome, the woman develops cachexia, possible hair loss in the axillary and pubic area, and the development of acute adrenal insufficiency, manifested by a sharp decrease in blood pressure, nausea, vomiting, weakness, and rapid heartbeat. Without timely assistance, this condition can be fatal.

**Diagnosis and treatment.** An endocrinologist diagnoses and treats diseases of the pituitary gland. At the first visit, the doctor will collect an anamnesis (complaints, information about previous diseases and hereditary predisposition) and, on the basis of this, prescribe the necessary hormonal profile study (blood test for hormones), a test with thyrotropin-releasing hormone, a test with synacthen, etc. If necessary, computed tomography of the brain, magnetic resonance imaging of the brain, etc. may be prescribed. Treatment of pituitary gland diseases is aimed at normalizing the level of hormones in the blood, and in the case of adenoma, reducing the pressure of the tumor on the surrounding brain structures. If there is a lack of pituitary hormones, hormone replacement therapy is used: the person is given drugs that are analogues of the necessary hormones. This treatment often lasts for life. Fortunately, pituitary tumors are extremely rarely malignant. However, their treatment is a difficult task for the doctor.

**Conclusion.** For adenoma and other neoplasms, surgical treatment is usually indicated. In addition, to relieve symptoms of the disease and suppress tumor growth, radiation therapy is used as indicated. For some types of hormone-dependent adenomas, as well as in the presence of contraindications to surgical treatment, drug therapy is used, which helps to suppress hormonal hypersecretion, and in some cases leads to a decrease in tumor size. Small hormonally inactive tumors without symptoms of compression of the optic nerves require dynamic observation without the use of surgical treatment. Disturbances in the functioning of the pituitary gland pose a serious danger to human health and can lead to the development of a number of serious diseases. Timely diagnosis and proper treatment are the key to longevity and good health.

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