

**INFERTILITY RESULTING FROM ENDOCRINE DISORDERS IN WOMEN OF REPRODUCTIVE AGE: PATHOGENESIS AND TREATMENT METHODS.**

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**Abstract:** Endocrinological diseases are often chronic and require long-term care. Therefore, a comprehensive approach is necessary to improve the patient's quality of life. In this process, diet regulation, increased physical activity, stress management, and regular medical monitoring play an important role. Psychological support for patients is also important, since chronic diseases often have a negative impact on mental health. It is also necessary to support patients in the family and social environment, helping them to maintain a healthy lifestyle. Preventive measures are of great importance in preventing endocrine diseases. It is important to maintain a healthy lifestyle, undergo regular medical examinations, and reduce risk factors.

Endocrine dysfunction is one of the most important causes of infertility in women and men. The hypothalamic–pituitary–gonadal axis (HPG) and other hormones such as thyroid, insulin, and prolactin play a central role in regulating reproductive function. This article reviews the impact of endocrine disorders on infertility, the mechanisms of pathogenesis, and modern diagnostic and therapeutic approaches. It also reviews medical and surgical approaches to restoring reproductive health and increasing the chances of pregnancy. Endocrine diseases are a complex and multifaceted set of pathologies that arise as a result of disorders in the functioning of the hormone-producing glands of the human body. Hormones are chemical substances that regulate the activity of various systems and organs of the body. Changes in their quantity or activity lead to many disorders in the body. Therefore, the detection, examination and effective treatment of endocrinological diseases is one of the current directions of modern medicine.

**Keywords:** Endocrine disruption, infertility, hypothalamic–pituitary–gonadal axis, hormonal dysfunction, polycystic ovary syndrome, ovarian cyst, hypothyroidism, hyperprolactinemia, treatment strategies.

**Introduction.** Infertility is a complex reproductive condition characterized by the inability to achieve pregnancy within a year in women and inadequate sperm quality or quantity in men. Endocrine disorders are associated with many cases of infertility, the main causes of which are dysfunction of the hypothalamic-pituitary-gonadal axis, hormonal imbalances, and metabolic disorders. In women, endocrine disorders are often associated with ovulatory dysfunction, which is observed in diseases such as polycystic ovary syndrome (PCOS), hypothyroidism, hypopituitarism, and hyperprolactinemia. In men, testosterone deficiency, insufficient production of pituitary hormones, or insulin and thyroid hormone disorders can inhibit spermatogenesis. The pathogenesis of infertility in endocrine disorders begins with a systemic disruption of hormonal signaling.

The hypothalamus changes the GnRH pulsation, the pituitary gland misregulates the production of LH and FSH, and the ovaries or testicles reduce hormone synthesis. As a result, ovulation is disrupted, endometrial readiness decreases, and the chances of pregnancy decrease.

Endocrine dysfunction leading to infertility usually develops in three directions.

The first pathway is hypothalamic–pituitary–gonadal axis dysfunction. The hypothalamus produces a pulsatile GnRH (gonadotropin-releasing hormone) that stimulates the pituitary gland

to secrete luteinizing hormone (LH) and follicle-stimulating hormone (FSH). LH and FSH control follicle development and ovulation in the ovaries, and regulate spermatogenesis in men. Dysfunction of the hypothalamus or pituitary gland leads to impaired levels of GnRH, LH, and FSH.

The second area is gonadal dysfunction. Insufficient hormone production by the ovaries or testes leads to infertility. In women, this condition can be associated with polycystic ovary syndrome (PCOS), acute or chronic oophoritis, cysts, or premature ovarian failure. In men, insufficient testosterone production by Leydig cells inhibits spermatogenesis and leads to reproductive dysfunction.

The third area is metabolic and hormonal imbalance. Changes in insulin, thyroid hormones, prolactin, and cortisol levels directly affect the reproductive system. For example, high prolactin levels (hyperprolactinemia) inhibit GnRH secretion, reduce LH and FSH production, and suppress ovulation. Hypothyroidism slows down endometrial and follicular development, and in men, reduces testosterone synthesis. Insulin resistance, on the other hand, promotes the development of PCOS and exacerbates ovulatory dysfunction.

The main causes of endocrine infertility in men are testosterone deficiency, decreased or increased levels of LH and FSH, as well as thyroid and insulin imbalance. Hypotestosteronemia slows spermatogenesis, impairs Leydig cell function, and leads to decreased libido. Hypogonadotropic hypopituitarism, on the other hand, stops sperm production through LH and FSH deficiency. Hormone monitoring is central to the diagnosis of endocrine infertility. In women, LH, FSH, prolactin, TSH, estrogen, and progesterone levels are checked, and in men, testosterone, LH, FSH, and prolactin are checked. If necessary, the function of the reproductive system is assessed using a pulsatile GnRH test, ultrasound, and acute laboratory tests.

**Treatment strategies.** Ovulation inducers, such as clomiphene citrate or letrozole, stimulate the development of a dominant follicle in PCOS. Gonadotropins restore ovulation in case of deficiency. Dopamine agonists (bromocriptine, cabergoline) reduce prolactin levels in the treatment of hyperprolactinemia. Thyroid dysfunction is normalized with levothyroxine or antithyroid drugs. If necessary, ovarian or pituitary pathologies are treated surgically, and in vitro fertilization (IVF) and other assisted reproductive technologies increase the chances of pregnancy.

Lifestyle and metabolic control are also important. Diet, physical activity, and stress reduction normalize GSH function, and drugs such as metformin are effective in restoring ovulation in insulin resistance. Thus, early detection and effective treatment of endocrine infertility play a central role in preserving reproductive function in women and men, increasing the chances of pregnancy, and family planning.

**Conclusion.** Endocrine dysfunction is one of the most important causes of infertility in women and men. Hormones such as the hypothalamic–pituitary–gonadal axis, thyroid, prolactin, and insulin play a central role in the normal functioning of the reproductive system. Endocrine disorders lead to ovulation dysfunction, delayed follicular development, impaired spermatogenesis, and reduced fertility. Hormone monitoring, ultrasound, and laboratory tests are essential in the diagnostic process. Treatment is individualized depending on the type of disorder: ovulation inducers, gonadotropins, dopamine agonists, thyroid therapy, as well as surgery and assisted reproductive technologies provide effective results. Optimization of lifestyle and metabolic control is also important in restoring reproductive health. At the same time, early

detection and proper treatment of endocrine infertility play a central role in preserving reproductive function in women and men, increasing the chances of pregnancy, and family planning.

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