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ENDOMETRIOSIS AND PREGNANCY: MODERN CONCEPTS ABOUT THE IMPACT OF THE DISEASE ON WOMEN'S REPRODUCTIVE FUNCTION.

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Annotation

Endometriosis is one of the most common chronic gynecological diseases in women of reproductive age and represents a serious challenge in modern reproductive medicine. This condition is associated with impaired fertility, chronic pelvic pain syndrome, hormonal and immunological changes, and an increased risk of pregnancy complications. Despite significant advances in modern gynecology, the mechanisms by which endometriosis influences conception, implantation, and gestation continue to be actively studied. This article presents current data on the pathogenesis of endometriosis, its impact on reproductive function, pregnancy characteristics, and modern methods of diagnosis, treatment, and fertility preservation.

Key words: endometriosis , pregnancy, infertility, endometrioma , ovarian reserve, implantation, ART, IVF, chronic inflammation, reproductive medicine.

Introduction

Endometriosis is a chronic estrogen-dependent disorder in which tissue morphologically and functionally similar to the endometrium is located outside the uterine cavity. The pathological process is most often localized in the ovaries, pelvic peritoneum, fallopian tubes, retrocervical region, and intestines. In recent decades, endometriosis has been considered not only a localized gynecological pathology but also a systemic disease accompanied by significant immunological, inflammatory, and metabolic disturbances. According to global statistics, the disease is diagnosed in approximately one in ten women of reproductive age. Among patients with infertility, the incidence of endometriosis is significantly higher, reaching 40-50%.

Of particular clinical significance is the impact of endometriosis on a woman's reproductive function. The disease disrupts ovulation, impairs oocyte quality, alters endometrial receptivity , and negatively impacts embryo implantation. Furthermore, endometriosis is associated with an increased risk of pregnancy complications, including threatened miscarriage, premature birth, and placental insufficiency. In today's world, the problem of endometriosis is particularly pressing due to the trend toward delayed pregnancy planning, the increasing number of women with infertility, and the widespread use of assisted reproductive technologies.

Etiology and pathogenesis of endometriosis

Despite extensive research, there is still no unified theory for the origin of endometriosis. The most widely accepted theory is the retrograde menstruation theory proposed by Sampson , which posits that endometrial cells enter the abdominal cavity through the fallopian tubes during menstruation, where they implant and continue to function. However, retrograde menstruation is observed in many women, while endometriosis does not develop in everyone. This suggests the

important role of additional factors, including immunological disorders, genetic predisposition, and hormonal imbalances.

Chronic inflammation plays a particularly important role in the pathogenesis of the disease. Endometriosis lesions exhibit increased production of proinflammatory cytokines, prostaglandins, and growth factors. These changes contribute to the development of a pathological microenvironment, impaired angiogenesis, and disease progression. Oxidative stress, accompanied by the accumulation of free radicals and damage to cell membranes, plays a significant role . Reactive oxygen species have a toxic effect on oocytes and granulosa cells , impairing egg maturation and reducing their reproductive potential.

Furthermore, endometriosis is associated with impaired immune response. Patients exhibit decreased natural killer cell activity and altered macrophage function, which facilitates the survival and proliferation of endometriotic cells.

The impact of endometriosis on reproductive function

Endometriosis has a multifactorial impact on a woman's reproductive system. One of the primary mechanisms of infertility is ovulation dysfunction. Chronic inflammation and hormonal changes disrupt follicle growth and maturation . Ovarian endometrioma has a particularly significant impact on fertility . Endometrioid cysts disrupt microcirculation and cause mechanical damage to ovarian tissue, leading to a decrease in ovarian reserve.

Patients with endometriosis often experience decreased levels of anti-Müllerian hormone and a reduced number of antral follicles. These changes indicate depletion of the follicular apparatus and a decrease in reproductive potential . A deterioration in oocyte quality is an additional factor. Increased oxidative stress leads to mitochondrial damage , disruption of meiosis, and a decrease in the fertilizing capacity of eggs. Adhesions also play a significant role, disrupting the anatomical relationships of the pelvic organs, impairing fallopian tube patency, and hindering sperm-egg encounters.

Endometriosis and embryo implantation

One of the most challenging aspects of infertility associated with endometriosis is impaired embryo implantation . Endometrial receptivity is the ability of the uterine lining to support embryo implantation and the subsequent development of pregnancy. In endometriosis, this process is disrupted due to chronic inflammation and altered immune response . Patients exhibit abnormal expression of progesterone and estrogen receptors, as well as altered production of cytokines and growth factors. This leads to a reduced ability of the endometrium to implant, even with good embryo quality. Furthermore, impaired endometrial vascularization and altered angiogenesis are also significant, impairing conditions for placental formation.

Pregnancy with endometriosis

Despite the significant impact of the disease on fertility, pregnancy in patients with endometriosis is possible both naturally and with the use of ART.

Interestingly, many women experience a temporary decrease in disease activity during pregnancy. This is due to the absence of menstruation and increased progesterone levels, which have an antiproliferative effect on endometriotic lesions.

However, pregnancy with endometriosis is considered high-risk. These patients are more likely to experience:

- threat of spontaneous miscarriage
- premature birth
- placental insufficiency
- preeclampsia
- bleeding
- intrauterine growth retardation
- complications of labor

A particularly high risk of complications is observed in deep infiltrative forms of endometriosis.

Assisted reproductive technologies

ART is one of the most effective methods of treating infertility in patients with endometriosis.

The most widely used are:

- in vitro fertilization
- ICSI
- embryo cryopreservation
- cryopreservation of oocytes

The effectiveness of ART programs depends on the patient's age, disease stage, ovarian reserve, and the presence of endometrioma. Despite a decrease in the number of oocytes retrieved, many patients achieve satisfactory pregnancy rates.

Modern methods of treatment

Treatment of endometriosis should be comprehensive and individualized.

The main areas are:

- drug therapy
- surgical treatment
- ART
- fertility preservation methods

Hormonal therapy is aimed at suppressing disease activity and reducing inflammation. Surgical treatment is used for severe pain, large endometriomas , and infertility. Particular attention is paid to organ-preserving surgeries, which minimize damage to ovarian tissue.

Preservation of fertility

In patients with endometriosis, methods of preserving fertility are of great importance, especially before surgical treatment.

These include:

- cryopreservation of oocytes
- embryo cryopreservation
- ovarian tissue preservation

These methods can increase the likelihood of successful reproductive function in the future.

Conclusion

Endometriosis is a complex multifactorial disease that has a significant impact on a woman's reproductive function and the course of pregnancy. The main mechanisms of infertility are chronic inflammation, oxidative stress, ovulation disorders, and decreased receptivity. Endometrial cancer. Despite existing difficulties, modern treatment methods and assisted reproductive technologies allow many patients to successfully achieve reproductive function . The development of personalized medicine, improvement of early diagnostic methods, and the introduction of innovative fertility preservation technologies remain promising areas.