



## THE INCIDENCE AND FACTORS LEADING TO THE DEVELOPMENT OF ECTOPIC PREGNANCY IN A RETROSPECTIVE GROUP IN THE PRIARALYE REGION

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### ABSTRACT

*This article describes the study of the incidence rate in dynamics and the factors leading to the development of ectopic pregnancy, as well as early and long-term complications after tubal abortion surgeries in 65 patients within a retrospective group of 816 women with ectopic pregnancy in the Priaralye region.*

**Relevance of the Problem.** According to WHO data, scientific and practical issues related to ectopic pregnancy continue to be studied extensively. Ectopic pregnancy (EP) refers to the implantation of a fertilized egg outside the uterine cavity. In recent years, there has been a significant global increase in the number of patients diagnosed with this condition. The average incidence of ectopic pregnancy is 1.2–1.4% in relation to the total number of pregnancies and 0.8–2.4% in relation to deliveries. In the United States, the incidence of ectopic pregnancy varies from 1 in 100 to 1 in 400 conceptions, while in Russia it is 1 in 200 pregnancies [3, 7]. In our republic, ectopic pregnancy remains one of the serious issues in gynecology, being diagnosed in approximately 2% of all pregnancies, with an increasing frequency [5].

Despite timely diagnosis, coordinated efforts of resuscitation and surgical teams of obstetricians-gynecologists, comprehensive intensive therapy, and well-developed management strategies for this pathology, maternal mortality remains within 5–10% in pregnancy-related cases worldwide. Another significant issue is the reproductive function after an initial ectopic pregnancy, as more than 60% of women experience impaired reproductive function following surgical treatment, and the recurrence rate of ectopic implantation is 20–30%. Thus, preserving reproductive function after an ectopic pregnancy is a critical medical and social issue [1, 6].

**The aim of the study** is to investigate the incidence and factors leading to the development, as well as early and long-term complications after surgeries for ectopic pregnancy in the Priaralye region.

**Materials and Methods.** To achieve this objective, we collected clinical data from 2017 to 2022 at the Emergency Medical Center and the Republican Perinatal Center in the city of Nukus. During this period, these clinics provided care to 816 patients with ectopic pregnancies. The subjects of this study were 65 patients from a retrospective group who underwent surgery for ectopic pregnancy via tubal abortion.



**Results of the Study.** In recent years, there has been a global trend toward an increase in the incidence of ectopic pregnancy, including in the Priaralye region. Multiple factors contribute to the heightened risk of ectopic pregnancy: the steady rise in the number of inflammatory diseases of the internal reproductive organs, an increase in the number of abortions, the use of intrauterine and hormonal contraception, the use of ovulation inducers and assisted reproductive technologies, previous surgical procedures on the tubes, uterine and adnexal tumors or tumor-like formations, endometriosis, genital infantilism, autonomic-vascular and neuroendocrine disorders, increased trophoblast activity, and stress [1, 5].

The frequency of ectopic pregnancy was studied over time in relation to the number of deliveries. In 2017, there were 5,708 deliveries in Nukus, with an ectopic pregnancy incidence of 104 cases (1.8%)  $p < 0.05$ . By 2022, the number of deliveries increased to 6,922, and the incidence of ectopic pregnancy rose to 161 cases (2.3%)  $p < 0.05$ , indicating a 1.2-fold increase. For an in-depth analysis of the factors contributing to ectopic pregnancy and fertility disorders, 65 women who underwent unilateral salpingectomy for ectopic pregnancy due to tubal abortion were studied in the retrospective group from 2017 to 2020. These patients received antibacterial, restorative, and physiotherapy treatment during the postpartum period.

In the retrospective group, 31 (47.6%) were housewives, 12 (18.4%) were office workers, 11 (16.9%) were manual laborers, 6 (9.2%) were students, and 5 (7.6%) were medical workers. Regarding parity, 9 (13.8%) were primiparous, and 56 (86.1%) were multiparous. Among the multiparous women, 28 (50.0%) had their first delivery, 24 (42.8%) had their second ( $p < 0.05$ ), and 4 (7.1%) had their third.

An analysis of reproductive function characteristics before ectopic pregnancy in this cohort revealed that the average number of pregnancies did not exceed two. Notably, ectopic pregnancy occurring after three or more previous births was observed in only 4 (7.1%) ( $p < 0.05$ ). The number of women with one abortion was 3 (4.6%), and with two medical abortions in their history was 2 (3.0%) ( $p < 0.05$ ). The analysis of pregnancy outcomes in this group showed that both full-term births and medical abortions equally preceded ectopic pregnancy.

The analysis of 65 gynecological histories in the retrospective group with ectopic pregnancy highlighted somatic diseases (SD) as the most significant risk factors for developing ectopic pregnancy. The presence of SD during pregnancy in women with ectopic pregnancy in the retrospective group is shown in Diagram No. 1. The data indicate that the most common conditions in this region were anemia in 51 (78.4%), urinary system diseases in 29 (44.6%), endemic goiter in 18 (27.7%), gastrointestinal diseases, viral hepatitis, etc. The statistical significance was  $p < 0.05$ .

These findings indicate the significant impact of somatic diseases on the risk of ectopic pregnancy. Identifying and considering these factors is essential for developing preventive and therapeutic measures aimed at reducing the incidence of ectopic pregnancy and improving outcomes for women of reproductive age (Diagram 1).

From Diagram 1, it is evident that anemia is a characteristic condition among somatic pathologies in this region. Anemia contributes to an increased frequency of pregnancy complications in the early stages. Due to the reduced oxygen-transport function of the blood, there is a deterioration in the aggregate state of the blood in the microcirculation system and metabolism of the vascular endothelium, which may lead to the development of numerous

obstetric and gynecological pathologies. Urinary system diseases were detected in 29 (44.6%) ( $p < 0.05$ ) cases, manifesting as asymptomatic bacteriuria, cystitis and its recurrent form, chronic pyelonephritis, and urolithiasis. It is noteworthy that in the study group, extragenital diseases as risk factors for ectopic pregnancy were quite common, with an average of 1.9 cases per pregnant woman. Surgical interventions on the abdominal organs among patients in this group included appendectomy in 5 (7.6%), cholecystectomy, and hernia repair along the linea alba in 1 (1.5%) each.

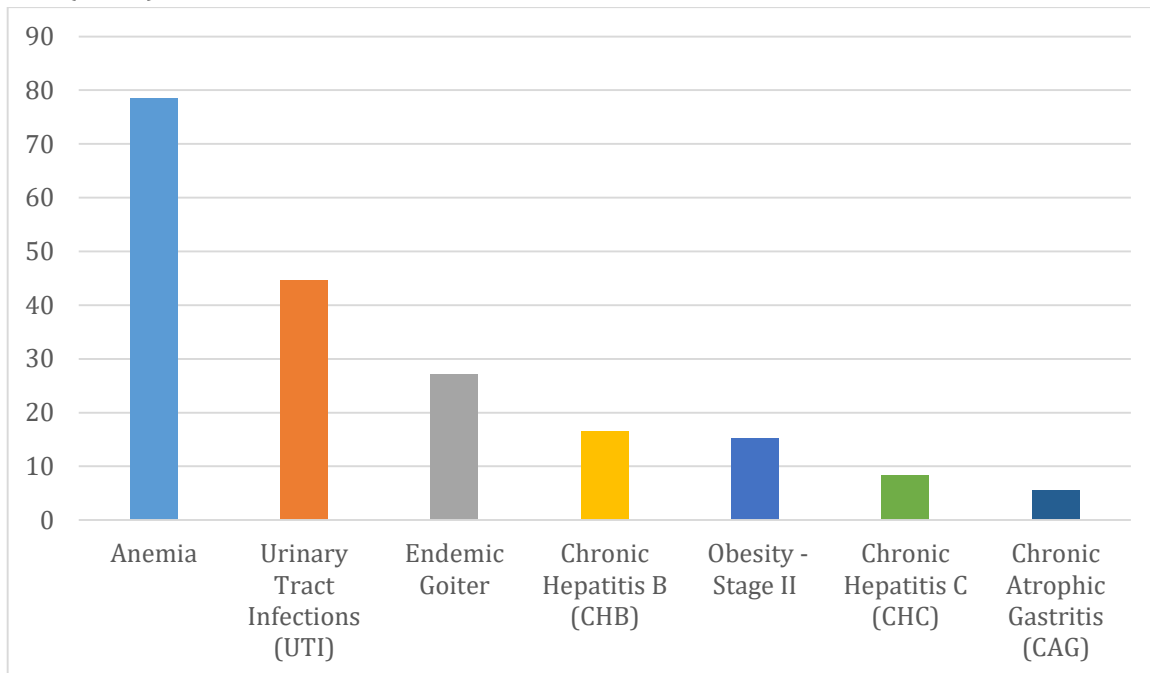


Diagram 1. Somatic Pathologies in Women with Ectopic Pregnancy

A thorough analysis of the obstetric and gynecological history revealed the following comorbid gynecological conditions: nonspecific vaginitis in 33 (50.7%), vaginal dysbiosis in 19 (29.2%), chronic endometritis confirmed by histological and functional studies in 6 (9.2%), chronic unilateral salpingitis in 36 (55.3%), chronic bilateral salpingitis in 29 (44.6%), mixed infections in 41 (63.0%), chlamydial infection in 24 (36.9%), gonorrhea in 7 (10.7%), adenomyosis in 8 (12.3%), the presence of intrauterine devices in 11 (16.9%), a history of abortion in 9 (13.8%), infertility associated with PCOS in 4 (6.1%), and uterine fibroids in 1 (1.5%) ( $p < 0.05$ ).

One mechanism for the development of ectopic pregnancy is associated with inflammatory processes of the uterine appendages, such as salpingitis. Salpingitis can lead to the formation of adhesions (scar tissue) inside or around the fallopian tubes. These adhesions may restrict the movement of the ovum, resulting in its implantation within the tube. Damage to the inner lining of the tubes causes narrowing or blockage, preventing the normal movement of the fertilized egg towards the uterus. The function of the cilia, which line the inner surface of the fallopian tubes and assist in the movement of the ovum, is impaired. Inflammatory processes can damage these cilia or reduce their motility [2, 6].

Our study found that sexually transmitted infections such as chlamydia, gonorrhea, and mixed infections are the primary causes of pelvic inflammatory diseases, which increase the



risk of ectopic pregnancy. These infections can lead to chronic inflammation and damage to the fallopian tubes.

Thus, the significant increase in the incidence of ectopic pregnancy in the Priaralye region in recent years is associated with somatic conditions such as anemia and urinary system diseases, as well as inflammatory diseases of the reproductive organs. A detailed analysis of the obstetric and gynecological history of the patients revealed that comorbid gynecological conditions and previous surgeries on abdominal organs also play an important role in the development of ectopic pregnancy. These findings emphasize the need for greater attention to the prevention and treatment of somatic and inflammatory diseases in women of reproductive age. Early diagnosis and timely treatment of these conditions can significantly reduce the risk of ectopic pregnancy and improve reproductive outcomes.

Continuous monitoring of the frequency of ectopic pregnancy and its risk factors, as well as further research to develop effective prevention and treatment strategies, are necessary. Raising women's awareness of potential risks and ways to minimize them is also important for improving overall health and reproductive function.

The age of menarche in the study group was  $13.8 \pm 1.1$  years, and most women had a regular and painless menstrual cycle—59 (90.7%). However, menstruation was moderate in 3 (4.6%) cases, scanty in 2 (3.0%), and heavy in 1 (1.5%) ( $p < 0.06$ ). The average duration of menstruation was  $4.6 \pm 1.3$  days, and the intermenstrual interval was  $27.2 \pm 2.3$  days ( $p < 0.05$ ).

The clinical presentation of a tubal abortion depends on the amount of blood spilled into the abdominal cavity and the body's reactivity. Out of 65 women, 38 (58.5%) had a satisfactory general condition, while 27 (41.5%) had moderate severity. Following a delay in menstruation, sudden cramping pain occurred in all women, but only 42 (64.6%) experienced brief fainting spells accompanied by dizziness. Abdominal pain usually occurred suddenly, localized in the lower abdomen on one side, and could be sharp, cramping, and exacerbated by movement. Pallor of the skin, an increased pulse rate of up to 96 beats per minute, and a decrease in blood pressure to 88/56 mmHg were found in 23 (35.3%) women. After cramping pain, dark brown scanty spotting due to the shedding of the decidual lining of the uterus appeared in 54 (83.0%) women.

All 65 (100.0%) patients had ultrasound signs of ectopic pregnancy: the absence of a gestational sac in the uterine cavity, enlargement of the uterine appendages, and signs of endometrial gravid hyperplasia. The volume of blood loss before surgery, according to ultrasound data, averaged  $280.0 \pm 50.0$  ml, which is very characteristic of this type of ectopic pregnancy. Transvaginal ultrasound scanning has a high resolution capacity.

For diagnostic purposes, 59 (90.8%) underwent a posterior vaginal fornix puncture, yielding a positive result. Treatment of ectopic pregnancy was carried out surgically: laparoscopic removal of the fallopian tube in 36 (55.4%) patients (Figures 1 and 2), and laparotomy for tubectomy in 29 (44.6%). It should be noted that right-sided ectopic pregnancy was 1.6 times more common than left-sided. The volume of blood loss during surgery averaged  $360.0 \pm 50.0$  ml for laparotomy and  $240.0 \pm 20.0$  ml for the laparoscopic method.



Figure 1. Laparotomic Tubectomy for Ectopic Pregnancy

Figure 2. Laparoscopic Tubectomy for Ectopic Pregnancy.

During abdominal cavity revision during surgery, adhesive processes were found in 21 (32%) patients, and all adhesions were removed. Preventive treatment of infectious complications in the postoperative period was conducted using the traditional method by administering third-generation cephalosporins (ceftriaxone) at 2 grams twice daily intravenously for 5 days in 41 (63.0%) patients with mixed infections, while 24 (36.9%) with chlamydial infections were prescribed macrolides (josamycin at 1.5 grams for 5 days or azithromycin at a daily dose of 1.0 gram for 3 days). In 7 (10.7%) patients with gonorrheal infections, amoxicillin/clavulanate was administered intravenously at 1.2 g twice daily for 5 days. Considering the presence of more than two risk factors and significant urinary tract infections, a therapeutic dose of sodium fosfomycin at 4.0 g twice daily for 5 days was administered to only 6 (9.2%) patients.

Despite antibiotic therapy, 7 (10.7%) patients experienced a body temperature increase to 38.0 degrees from the first postoperative day, which lasted for  $2 \pm 1.2$  days. One patient developed signs of decreased intestinal peristalsis on the second day after surgery, which was managed conservatively. The fever was accompanied by general intoxication, tachycardia, and pain in the lower abdomen and the area of the surgical wound. Exacerbation of chronic inflammatory processes in the remaining appendages was observed in 33 (50.7%) women, mainly those who underwent surgery using the laparotomic approach.

In the postoperative period, only 6 (9.2%) patients experienced deteriorated complete blood count results, including pronounced leukocytosis, decreased hemoglobin and red blood cell levels, increased ESR, elevated liver function test markers (bilirubin and enzymes), and reduced protein composition and coagulation system parameters (fibrinogen levels, platelets, and coagulation time per Lee-White).

After laparoscopic and laparotomic tubectomy, patients returned to normal life within 5-7 days. On the first day, patients were observed by medical staff and began to stand and walk. Following ectopic pregnancy, patients underwent physiotherapy sessions (massage, magnetotherapy), and recovery treatment using therapeutic mud containing Aral Sea salts in the second and third months postoperatively.

Fertility assessment was conducted over 12-24 months for 65 women in the retrospective group. During the first year, spontaneous pregnancy occurred in 9 (13.8%) women, and during the second year, in 4 (6.1%), with an overall pregnancy rate of 13 (20%). Unfortunately, in this group, 16 (24.6%) patients experienced a second ectopic pregnancy in the remaining fallopian



tube, with 5 (7.6%) cases in the first year and 11 (16.9%) in the second year of follow-up. Infertility was observed in 36 (55.3%) patients over two years. Recurrent ectopic pregnancy in 16 (24.6%) women led to secondary absolute infertility, necessitating the potential use of assisted reproductive technologies for these patients.

Thus, following unilateral tubectomy using laparoscopic or laparotomic methods and comprehensive treatment, reproductive function was restored in 13 (20.0%) patients within two years.

### Conclusions:

1. The incidence of ectopic pregnancy in the Priaralye region increased from 104 (1.8%) in 2017 to 161 (2.3%) in 2022 ( $p < 0.05$ ), depending on the number of childbirths. The main reasons for the increase are pelvic inflammatory diseases (PID): chronic unilateral salpingitis in 36 (55.3%), chronic bilateral salpingitis in 29 (44.6%), mixed infections in 41 (63.0%), combined chlamydial infection in 24 (36.9%), gonorrheal infection in 7 (10.7%), adenomyosis in 8 (12.3%), and a history of abortion in 9 (13.8%) ( $p < 0.05$ ).
2. In the postoperative period, exacerbation of chronic inflammatory processes in the remaining appendages was observed in 33 (50.7%) women, and 7 (10.7%) experienced systemic inflammatory response syndrome due to urinary tract infection with a temperature rise to 38.0 degrees, which was treated with comprehensive antibiotic therapy.
3. Following surgery for ectopic pregnancy and traditional treatment, reproductive function was restored in 13 (20.0%) women over two years.

These findings underscore the necessity of using innovative laparoscopic organ-preserving methods for the treatment of ectopic pregnancy, along with proposed rehabilitation methods to preserve fertility. Special attention should also be paid to the prevention and treatment of pelvic inflammatory diseases, especially in women at high risk of ectopic pregnancy.

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