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ORCID: <https://orcid.org/0000-0002-4192-1784>**CLINICAL AND MORPHOLOGICAL FEATURES OF TUBAL PREGNANCY** <http://dx.doi.org/10.5281/zenodo.18207897>**ABSTRACT**

Ectopic pregnancy remains one of the most frequent causes of urgent conditions in gynecology. Its major clinical manifestations often include delayed menstruation, irregular bleeding (the classical sign), and abdominal pain of varying severity that may radiate to the thigh or rectum, depending on the localization and stage of the pregnancy. Internal bleeding in the abdominal cavity is a frequent accompanying symptom. Successful treatment depends on early recognition and the provision of prompt, qualified medical care. The most informative diagnostic methods are the detection of the β -subunit of human chorionic gonadotropin (hCG) in blood serum—with diagnostic accuracy around 85%—and ultrasound examination, whose accuracy ranges from 78 to 100%. Surgical management is the main treatment approach, with laparoscopy being preferred due to its minimal invasiveness. In cases of massive bleeding or dense adhesions, laparotomy is performed. The primary operative procedure in tubal pregnancy is tubectomy, while tube-preserving surgery (tubotomy) is considered inappropriate because it increases the risk of recurrence.

Keywords: ectopic pregnancy; β -hCG; ultrasound; tubectomy; laparoscopy; treatment strategy.

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ORCID: <https://orcid.org/0000-0002-4192-1784>**КЛИНИКО-МОРФОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ТРУБНОЙ БЕРЕМЕННОСТИ****АННОТАЦИЯ**

Внематочная беременность по-прежнему является одной из наиболее распространённых причин неотложных состояний в гинекологии. Её ведущими клиническими проявлениями считаются задержка менструации, нарушения менструального цикла, мажущие кровянистые выделения (классический симптом) и боли различной интенсивности, нередко иррадиирующие в прямую кишку или бедро. Для данного состояния характерны признаки внутрибрюшного кровотечения. Эффективное лечение возможно только при своевременном выявлении патологии и оказании квалифицированной медицинской помощи. Основными диагностическими методами являются определение β -субъединицы хорионического гонадотропина человека в сыворотке крови (точность около 85%) и ультразвуковое исследование (точность 78–100%). Основным методом лечения является хирургическое вмешательство, преимущественно лапароскопическое. При

выраженном спаечном процессе или массивном кровотечении выполняется лапаротомия. Основной объём операции при трубной беременности — тубэктомия. Проведение туботомии, направленной на сохранение трубы, считается нецелесообразным, так как это может привести к рецидиву.

Ключевые слова: внематочная беременность; хорионический гонадотропин; ультразвук; тубэктомия; лапароскопия.

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BACHADONDAN TASHQARI HOMILADORLIKNING KLINIK VA MORFOLOGIK XUSUSIYATLARI

ANNOTATSIYA

Bachadondan tashqari homiladorlik ginekologik amaliyotda eng ko'p uchraydigan shoshilinch holatlardan biridir. Uning asosiy klinik belgilari – hayz ko'rishning kechikishi yoki buzilishi, qin orqali keladigan dog'li qon ketishlar (klassik belgi) hamda to'satdan yoki asta-sekin kuchayuvchi qorin og'rigi bo'lib, u son yoki to'g'ri ichakka tarqalishi mumkin. Qorin bo'shlig'ida qon ketish belgilarining mavjudligi bu holatning muhim klinik ko'rsatkichidir. Muvaffaqiyatli davolashning asosi – kasallikni erta aniqlash va malakali, o'z vaqtida tibbiy yordam ko'rsatishdir. Tashxisda qon zardobida inson xorionik gonadotropinining β -subbirligini aniqlash (taxminan 85% aniqlik) hamda ultratovush tekshiruvi (78–100% aniqlik) asosiy ahamiyatga ega. Davolashning asosiy yo'nalishi jarrohlik usul bo'lib, afzal variant sifatida laparoskopik yondashuv tanlanadi. Qattiq bitishmalar yoki kuchli qon ketish hollarida laparotomiya bajariladi. Tubal homiladorlikda odatda tubektomiya amalga oshiriladi. Fallop naychasini saqlashga qaratilgan tubotomiya esa qaytalanuvchi holat xavfini oshirishi sababli maqsadga muvofiq emas.

Kalit so'zlar: bachadondan tashqari homiladorlik; β -hCG; ultratovush; tubektomiya; laparoskopiya; davolash taktikasi.

Introduction: In the latter half of the 20th century and the beginning of the 21st century, ectopic pregnancy has increasingly become a pressing concern in gynecological practice. This condition remains one of the primary causes of maternal morbidity and mortality in early pregnancy. Despite advances in diagnostic technologies and treatment approaches, the frequency of ectopic implantation has not significantly decreased, mainly due to rising rates of pelvic inflammatory diseases, intrauterine device usage, and reproductive system surgeries. In a normal pregnancy, the fertilized ovum reaches the uterine cavity within 5–6 days after fertilization, where implantation occurs. However, in an ectopic pregnancy, the embryo implants outside the uterine cavity — most commonly within the fallopian tube, leading to what is called a **tubal pregnancy**. Depending on the site of implantation, other types such as ovarian, cervical, or abdominal pregnancies may also occur.

The morphological and functional state of the fallopian tubes is of great importance in ensuring the reproductive health of women. The fallopian tubes are paired organs that are directly involved in the processes of fertilization, zygote transport, and early embryo development. When their normal function is disrupted, women develop infertility, ectopic pregnancy, and inflammatory diseases [1,2,4]. Clinical and histomorphological studies conducted in recent years have shown that background changes observed in the fallopian tubes are of important diagnostic value as an early sign of pathological processes. Background changes are often understood as chronic salpingitis, endosalpingitis, perisalpingitis, fibrosis, microcirculatory disorders, epithelial dystrophies, and proliferative reactions. They are formed after prolonged inflammatory processes, hormonal imbalances, sexually transmitted infections, and surgical interventions. Such changes reduce the regeneration capabilities of the epithelial cover, destroy the activity of the ciliated epithelium, and as a result, transport of the fertilized egg is disturbed [3,5,6,8]. Histological analyzes show that

against the background of changes, structural disturbances, collagen accumulation, hyalinosis of smooth muscle fibers and vascular endothelium dysfunction are observed in all layers of the tube wall. At the electron microscopic level, mitochondrial dystrophies, loss of microvilli, and increased lysosomal activity are detected. These changes disrupt the normal peristaltic movements of the tubes, which increases the risk of ectopic implantation. In clinical practice, laparoscopy, histological biopsy, immunohistochemical analyzes and ultrasound diagnostics are widely used to detect background changes [7,9,10,12]. In particular, markers such as CD68, Ki-67, and VEGF are important in determining the level of inflammation and proliferative processes. Based on these indicators, it is possible to early detect functional insufficiency of the fallopian tubes and prevent reproductive problems. From a preventive point of view, it is necessary to early detect sexually transmitted infections among women, maintain hormonal balance, fully treat chronic inflammatory diseases, and establish regular medical examinations in women of reproductive age [11,13,15,14]. At the same time, assessment of background changes plays an important role in maintaining reproductive health, preventing infertility, and reducing the risk of ectopic pregnancy. Ectopic pregnancy is one of the most common gynecological pathologies among women, its share is 1.5–2% of all pregnancies [19,20]. It is mainly caused by a blastocyst implanted in the fallopian tube. The increase in the frequency of this pathology in recent years is associated with the increase in chronic salpingitis, sexually transmitted infections, and the number of laparoscopic interventions. The structural and functional state of the fallopian tube is of decisive importance in the development of ectopic pregnancy. Chronic inflammation, epithelial degeneration, sclerosis of the muscle layer, and circulatory disorders disrupt the transport function of the tube [16,17,18].

Aim of the Study: The main purpose of this research is to analyze the clinical and morphological characteristics of tubal pregnancy, to identify diagnostic criteria that contribute to early detection, and to determine effective treatment strategies that minimize the risk of complications and recurrence.

Materials and methods. The present study was conducted at the Department of Obstetrics and Gynecology of the Bukhara State Medical Institute and the affiliated clinical base. The research included women of reproductive age diagnosed with tubal pregnancy who received inpatient treatment between 2021 and 2024.

Study Design: A prospective and partially retrospective observational study was carried out. Clinical, laboratory, ultrasound, and histopathological data were analyzed.

Inclusion Criteria: Women aged 18–45 years; Confirmed diagnosis of ectopic (tubal) pregnancy based on clinical and instrumental findings;

Availability of histological material from surgically removed fallopian tubes.

Exclusion Criteria: Non-tubal forms of ectopic pregnancy (ovarian, cervical, or abdominal); Chronic systemic diseases affecting hormonal balance; Incomplete medical documentation or insufficient diagnostic data.

Clinical and Laboratory Evaluation: A detailed anamnesis was obtained from all patients, including information on menstrual cycle regularity, prior pregnancies, abortions, inflammatory diseases, and surgical interventions.

Physical examination assessed the presence of abdominal tenderness, hemodynamic stability, and vaginal bleeding.

Laboratory investigations included: Determination of serum β -hCG concentration using immunoassay methods; Complete blood count to evaluate hemoglobin levels and leukocytosis; Urinalysis to exclude concomitant urinary pathology.

Ultrasound Examination: Transvaginal and transabdominal ultrasonography was performed to identify the location of the gestational sac, evaluate its dimensions, and assess the presence of free fluid in the abdominal cavity. The size of the fallopian tube and embryo sac was measured to estimate gestational age.

Morphological Study: Surgically removed fallopian tubes were fixed in formalin, sectioned, and stained with hematoxylin and eosin for histopathological examination. The degree of

trophoblastic invasion, the condition of the muscular layer, and the presence of hemorrhagic changes were evaluated microscopically.

Statistical Analysis: The data were processed using **SPSS 25.0** software. Descriptive statistics, correlation analysis, and comparative tests were used. Statistical significance was established at $p < 0.05$.

Results and discussion. A total of **84 women** with confirmed tubal pregnancy were examined during the study period. The age of the patients ranged from **19 to 42 years**, with the majority (about 68%) belonging to the **25–35-year age group**. Most patients (76%) were multiparous, while 24% were primigravida. A history of previous pelvic inflammatory disease or surgical interventions on the fallopian tubes was found in 41% of the cases.

Clinical Features The most frequent clinical symptoms observed were:

- Delayed menstruation in 79 cases (94%);
- Lower abdominal pain of varying intensity in 72 cases (86%);
- Vaginal spotting or irregular bleeding in 69 cases (82%);
- Signs of internal bleeding (pallor, dizziness, hypotension, tachycardia) in 33 cases (39%).

In several patients, the clinical presentation was atypical, which complicated early diagnosis. The classical triad—**amenorrhea, abdominal pain, and bleeding**—was detected in only 62% of women, consistent with data from international studies.

Ultrasound and Laboratory Findings Transvaginal ultrasound was informative in 94% of cases, allowing visualization of the adnexal mass or gestational sac outside the uterus. Free fluid in the abdominal cavity was detected in 46 patients (54%). The average diameter of the gestational sac ranged from 8 to 25 mm, depending on the gestational age (3–7 weeks).

Morphological Characteristics Histopathological analysis of resected fallopian tubes demonstrated the following changes:

- Destruction of the mucosal folds and thinning of the muscular layer;
- Areas of hemorrhage and necrosis in the implantation zone;
- Deep invasion of trophoblastic tissue into the muscular wall in 61% of cases;
- Partial rupture or complete tearing of the tubal wall in 27% of cases.

The degree of trophoblastic invasion correlated positively with gestational age. In early stages (3–4 weeks), trophoblastic cells were confined to the mucosal layer, while by 6–7 weeks they penetrated deeply into the muscular layer, predisposing the tube to rupture.

Discussion The results of our study align with global observations emphasizing that delayed diagnosis remains a major factor contributing to complications in tubal pregnancy. The integration of quantitative β -hCG testing with high-resolution ultrasound substantially improves early detection rates, enabling less invasive management and better reproductive outcomes.

Morphological assessment demonstrates that the extent of trophoblastic invasion serves as a key determinant of clinical progression and surgical strategy. Deep invasion correlates with tubal rupture and hemoperitoneum, indicating the need for prompt surgical intervention.

Our findings reaffirm that **laparoscopy** should be the preferred method whenever possible due to its lower trauma, shorter recovery time, and minimal postoperative complications. However, in hemodynamically unstable patients or cases with extensive bleeding, **laparotomy** remains the life-saving approach.

Thus, optimizing diagnostic algorithms and maintaining readiness for immediate surgical action are crucial for reducing morbidity and preventing maternal mortality associated with ectopic pregnancy.

Conclusion. The conducted research confirmed that tubal pregnancy continues to represent a serious problem in reproductive medicine, posing a significant threat to women's health and reproductive potential.

Timely diagnosis and prompt medical intervention are essential to preventing life-threatening complications.

Clinical manifestations such as delayed menstruation, abdominal pain, and irregular bleeding are the main diagnostic indicators; however, these symptoms are often nonspecific. Therefore, a combination of serum β -hCG testing and ultrasound examination should be considered the gold standard for early and reliable diagnosis.

Histomorphological examination of the fallopian tube revealed that the degree of trophoblastic invasion directly depends on the gestational age and determines the risk of tubal rupture. Recognition of these morphological changes helps in predicting clinical outcomes and in selecting an optimal surgical approach.

Laparoscopic intervention has proven to be the most effective and minimally invasive surgical method for managing tubal pregnancy, ensuring quick recovery and preservation of reproductive function. Nevertheless, laparotomy remains necessary in cases complicated by massive intra-abdominal bleeding or adhesions.

In summary, improving diagnostic accuracy, early referral of patients, and the rational choice of surgical tactics are key factors that can significantly reduce the rate of complications and recurrence in tubal pregnancy.

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