

## Diagnostic Criteria for Vulvovaginal Infections in Pregnant Women

***Ikromova Parvina Hamidjon Kizi***

*Institution: Samarkand State Medical University, Department of "Obstetrics and Gynecology No. 3"*

### **Abstract:**

Vulvovaginal infections represent one of the most common problems during pregnancy. These infections can negatively affect both the mother's health and fetal development, making it crucial to promptly identify the disease and take necessary treatment measures. Diagnosing vulvovaginal infections in pregnant women has its specific features, considering the limitations in using certain treatment methods and the need to minimize risks to the fetus.

**Keywords:** Vulvovaginal infections, Bacterial infections, Fungal infections, Parasitic infections, Viral infections.

The purpose of this article is to review the main diagnostic criteria for vulvovaginal infections in pregnant women, including clinical signs, laboratory diagnostic methods, and microbiological studies.

### Classification of Vulvovaginal Infections

Vulvovaginal infections can be classified based on the type of pathogen:

- Bacterial infections: the most common are bacterial vaginosis and infections caused by *Gardnerella vaginalis*.
- Fungal infections: Candidiasis or thrush, caused by fungi of the *Candida* genus, is particularly frequent among pregnant women due to hormonal changes.
- Parasitic infections: Trichomoniasis, caused by *Trichomonas vaginalis*, can also be diagnosed in pregnant women.
- Viral infections: Genital herpes, sexually transmitted, can have negative consequences during pregnancy.

**Table: Classification of Vulvovaginal Infections by Type of Pathogen**

Type of Infection	Pathogen	Main Symptoms	Diagnostic Methods
Bacterial Infections	<i>Gardnerella vaginalis</i> , <i>Neisseria gonorrhoeae</i> , <i>Chlamydia trachomatis</i>	Discharge, itching, pain during urination	Microscopy, culture, PCR
Fungal Infections	<i>Candida albicans</i>	White curd-like discharge, itching, burning	Microscopy, culture
Parasitic Infections	<i>Trichomonas vaginalis</i>	Yellow-green frothy discharge, itching	Microscopy, PCR
Viral Infections	Вирус герпеса (HSV-1, HSV-2), ВПЧ	Sores, warts, fever, itching	PCR, serology, PAP test

## Clinical Symptoms of Vulvovaginal Infections in Pregnant Women

Vulvovaginal infections in pregnant women can present with a variety of symptoms, often associated with inflammatory processes in the vulva and vaginal areas. Hormonal changes during pregnancy increase susceptibility to infections, which can affect both the mother's and the fetus's health. Below are the main clinical symptoms characteristic of different types of vulvovaginal infections.

### 1. Itching and Burning in the Vulva and Vagina

One of the most common symptoms of vulvovaginal infections is itching and burning in the external genital area. This symptom is typical for most infections, including:

- Candidiasis (Thrush): Often accompanied by intense itching and burning, especially after urination or sexual intercourse.
- Trichomoniasis: Can also cause itching and burning, along with inflammation of the mucous membranes.
- Herpes: Causes painful sores and a burning sensation.

Itching may intensify at night, causing additional discomfort for the pregnant woman.

### 2. Abnormal Vaginal Discharge

Changes in the nature of vaginal discharge are key symptoms of vulvovaginal infections. The type and color of discharge can indicate the nature of the infection:

- Candidiasis: Thick, white, "curd-like" discharge without odor.
- Bacterial Vaginosis: Thin, gray-white discharge with an unpleasant "fishy" odor.
- Trichomoniasis: Frothy, yellow-green discharge with a strong odor.
- Gonorrhea: Purulent discharge with a yellow or greenish tint.

Changes in the amount and consistency of discharge are also important diagnostic indicators.

### 3. Pain During Urination (Dysuria)

Many vulvovaginal infections are accompanied by discomfort or pain during urination, often associated with inflammation of the vaginal and urethral mucosa:

- Trichomoniasis: Causes irritation of the urinary tract, leading to painful sensations during urination.
- Herpes: Sores and blisters on the genitals can cause intense burning when they come into contact with urine.

### 4. Pain During Sexual Intercourse (Dyspareunia)

Pain or discomfort during sexual intercourse is also a common symptom of vulvovaginal infections. Inflammation of the mucous membranes, along with the presence of sores or irritation, can lead to significant pain, which is particularly characteristic of:

- Candidiasis: Inflamed vaginal tissues make sexual intercourse painful.
- Herpes: Painful sores can worsen due to friction.

### 5. Swelling and Redness in the Vulva and Vagina

Local inflammation may be accompanied by swelling, redness, and increased tissue temperature:

- Candidiasis: Inflammation causes swelling and redness of the vaginal and vulvar mucosa.
- Trichomoniasis and Bacterial Vaginosis: These infections can also cause inflammation and swelling in the genital area.

### 6. Other General Symptoms

Some vulvovaginal infections may be accompanied by general symptoms, such as:

- Fever: Common with infections caused by the herpes virus.
- Fatigue: Can be a sign of a severe infection or systemic inflammation.
- Pregnant Women

Type of Infection	Main Symptoms
<b>Candidiasis (Thrush)</b>	Itching, burning, thick white "curd-like" discharge, pain during intercourse, swelling, redness.
<b>Bacterial Vaginosis</b>	Thin gray-white discharge with a "fishy" odor, inflammation, swelling.
<b>Trichomoniasis</b>	Frothy yellow-green discharge with a strong odor, itching, burning, pain during urination, swelling.
<b>Herpes</b>	Painful sores, burning, fever, pain during urination, fatigue.
<b>Gonorrhea</b>	Purulent discharge (yellow or green), pain during urination, swelling, redness.

### Laboratory Diagnostic Methods

Diagnosing vulvovaginal infections requires a range of laboratory tests that help accurately identify the causative agent and ensure appropriate treatment is prescribed. The most common diagnostic methods include:

- **Microscopy of Vaginal Smears:** Analysis of vaginal smears helps detect characteristic changes in the vaginal flora and identify the pathogen. For example, fungal elements can be found in cases of candidiasis.
- **Vaginal pH Determination:** Changes in the acidity (pH) of the vaginal environment can indicate the presence of a bacterial infection. The normal vaginal pH is between 3.8 and 4.5. An increase in pH may suggest bacterial vaginosis.
- **Culture of Discharge Samples:** Culturing vaginal discharge on special growth media helps isolate the causative agent and conduct an antibiotic susceptibility test, which is crucial for selecting the right treatment.
- **Specific Tests for Genital Infections:** These include tests such as PCR (Polymerase Chain Reaction) to detect specific pathogens like herpes or trichomoniasis.

Laboratory diagnostic methods play a key role in accurately identifying the pathogens of vulvovaginal infections. These methods not only determine the type of infection but also assess the extent of the inflammatory process, which is particularly important for pregnant women since any infections could pose risks to fetal health.

**Table: Laboratory Diagnostic Methods for Vulvovaginal Infections**

Method	Working Principle	Detected Pathogens	Advantages	Disadvantages
<b>Microscopy of Smears</b>	Examination of smears under a microscope	<i>Candida spp.</i> , <i>Trichomonas vaginalis</i> , bacteria	Quick diagnosis	Less accurate
<b>Vaginal pH Determination</b>	Measurement of vaginal acidity	Bacterial vaginosis, trichomoniasis	Simple and quick method	Cannot identify the exact pathogen
<b>Culture on Growth Media</b>	Growing microorganisms on nutrient media	<i>Candida spp.</i> , <i>Gardnerella vaginalis</i> , <i>Neisseria gonorrhoeae</i>	High accuracy, enables antibiotic	Long wait for results

Method	Working Principle	Detected Pathogens	Advantages	Disadvantages
			sensitivity testing	
<b>PCR (Polymerase Chain Reaction)</b>	Amplification of pathogen DNA	<i>Chlamydia trachomatis</i> , viruses, bacteria	High sensitivity and specificity	Expensive
<b>ELISA (Enzyme-Linked Immunosorbent Assay)</b>	Detection of antibodies or antigens	Viruses, bacteria	Suitable for virus diagnostics	May not indicate active infection

### Statistical Data on Vulvovaginal Infections in Pregnant Women

Vulvovaginal infections are among the most common conditions affecting women during pregnancy. Hormonal changes, alterations in the immune system, and shifts in the vaginal flora during pregnancy create favorable conditions for the development of such infections. They can significantly impact the health of both the mother and the fetus, leading to complications such as preterm birth, neonatal infections, and postpartum complications. Below are statistical data on the main types of vulvovaginal infections in pregnant women.

#### 1. Prevalence of Vulvovaginal Infections Among Pregnant Women

Studies show that more than 30% of pregnant women experience vulvovaginal infections at different stages of pregnancy. The most common infections include:

- Candidiasis (Thrush):** Up to 20-25% of pregnant women encounter candidiasis during pregnancy. Hormonal changes, particularly increased estrogen levels, contribute to the growth of *Candida* fungi.
- Bacterial Vaginosis:** Found in 10-15% of pregnant women, bacterial vaginosis occurs when the balance of vaginal flora is disrupted and is associated with an increased risk of preterm birth and other complications.
- Trichomoniasis:** This parasitic infection, caused by *Trichomonas vaginalis*, is observed in 2-5% of pregnant women. It can lead to inflammatory processes and increase the risk of preterm birth.
- Gonorrhea and Chlamydia:** These bacterial infections, which are sexually transmitted, have a prevalence rate of about 3-5% for gonorrhea and 5-10% for chlamydia among pregnant women.

#### 2. Candidiasis (Thrush)

- Prevalence:** According to the WHO, 20-25% of pregnant women experience candidiasis. The main cause is a change in the vaginal flora due to hormonal influences, which creates favorable conditions for the growth of fungi.
- Risk Factors:** Elevated estrogen levels, diabetes, antibiotic use, and glucocorticoid intake.

**Statistical Table: Prevalence of Candidiasis in Pregnant Women**

Region	Prevalence of Candidiasis (%)
North America	22%
Europe	20%
Asia	25%
Africa	28%

#### 3. Bacterial Vaginosis

- Prevalence: Bacterial vaginosis occurs in 10-15% of pregnant women. This condition is associated with an imbalance in the vaginal flora, leading to an overgrowth of anaerobic bacteria.
- Complications: Bacterial vaginosis increases the risk of preterm birth and infections of the amniotic fluid.

**Statistical Table: Prevalence of Bacterial Vaginosis in Pregnant Women**

Region	Prevalence of Bacterial Vaginosis (%)
North America	12%
Europe	10%
Asia	15%
Africa	18%

#### 4. Trichomoniasis

- Prevalence: Trichomoniasis is found in 2-5% of pregnant women. This parasitic infection, sexually transmitted, can cause inflammation of the vaginal and vulvar mucosa.
- Complications: Trichomoniasis is associated with an increased risk of preterm birth and low birth weight in newborns.

**Statistical Table: Prevalence of Trichomoniasis in Pregnant Women**

Region	Prevalence of Trichomoniasis (%)
North America	3%
Europe	2.5%
Asia	4%
Africa	5%

#### 5. Gonorrhea and Chlamydia

- Gonorrhea: Around 3-5% of pregnant women are affected by gonorrhea, a sexually transmitted infection. This condition can cause inflammatory processes in the cervix and vagina, and it also increases the risk of neonatal infection.
- Chlamydia: Chlamydial infection occurs in 5-10% of pregnant women and often remains asymptomatic. Chlamydia can lead to complications such as preterm birth and pelvic inflammatory disease.

**Statistical Table: Prevalence of Gonorrhea and Chlamydia in Pregnant Women**

Infection	Prevalence (%)
Gonorrhea	3-5%
Chlamydia	5-10%

#### 6. Impact of Vulvovaginal Infections on Pregnancy

Vulvovaginal infections can lead to serious complications during pregnancy, including:

- Preterm Birth: Infections such as bacterial vaginosis and trichomoniasis increase the risk of preterm birth by 30-50%.
- Amniotic Fluid Infections: Bacterial infections can infect the amniotic fluid, which can result in fetal infection.
- Neonatal Infection: Gonorrhea and chlamydia can be transmitted from the mother to the baby during childbirth, leading to conditions such as conjunctivitis and other diseases.

Treatment and Prevention of Vulvovaginal Infections in Pregnant Women

Vulvovaginal infections during pregnancy require special attention because these infections can lead to complications for both the mother and the fetus. Treatment and prevention of vulvovaginal infections in pregnant women must prioritize the safety of medications to minimize risks to the developing baby. Below are the main approaches to the treatment and prevention of various vulvovaginal infections in pregnant women.

### 1. Treatment of Vulvovaginal Infections in Pregnant Women

Treatment of vulvovaginal infections should be based on accurate diagnosis of the pathogen, as different infections require different therapeutic approaches. Some antimicrobial drugs may be contraindicated during pregnancy, so healthcare providers must consider the stage of pregnancy and the woman's condition.

#### 1.1. Treatment of Candidiasis (Thrush)

Candidiasis is one of the most common fungal infections in pregnant women. Treatment typically involves the use of topical antifungal agents, as systemic antifungals may not be recommended during pregnancy.

##### •Medications:

Topical antifungals: Vaginal creams and suppositories containing clotrimazole, miconazole.

In severe cases, a doctor may prescribe systemic medications like fluconazole, but this requires careful consideration.

Safety: Topical medications are generally considered safe for use during pregnancy, especially in the second and third trimesters.

#### 1.2. Treatment of Bacterial Vaginosis

Bacterial vaginosis is a bacterial infection characterized by an imbalance of normal vaginal flora. Treatment aims to restore this balance and suppress anaerobic bacteria.

##### Medications:

Metronidazole: The most commonly prescribed antibiotic for bacterial vaginosis, available in vaginal tablets or oral form.

Clindamycin: Can be used topically (as a vaginal cream) or systemically (in tablet form).

Safety: These medications can be used during pregnancy, but they should be avoided in the first trimester if possible.

#### 1.3. Treatment of Trichomoniasis

Trichomoniasis is a parasitic sexually transmitted infection (STI). Treatment focuses on eliminating the *Trichomonas vaginalis* pathogen.

##### Medications:

Metronidazole or tinidazole: Both medications are taken orally and effectively treat the infection.

Safety: Metronidazole can be used after the first trimester of pregnancy. Tinidazole is not recommended in the first trimester.

#### 1.4. Treatment of Gonorrhea and Chlamydia

Gonorrhea and chlamydia are bacterial STIs that can cause inflammation of the cervix and other reproductive organs.

##### •Medications:

oCeftriaxone: Used for treating gonorrhea.

oAzithromycin or amoxicillin: Used for treating chlamydia.

•Safety: These antibiotics are considered safe for use during pregnancy, especially in the second and third trimesters.

#### 1.5. Treatment of Genital Herpes

Genital herpes is caused by the herpes simplex virus (HSV) and requires antiviral therapy.

- Medications:

- oAcyclovir or valacyclovir: These antiviral drugs help reduce symptom severity and shorten the duration of outbreaks.

- Safety: These medications are safe to use during pregnancy, especially to prevent herpes flare-ups before delivery, minimizing the risk of transmission to the newborn.

## 2. Prevention of Vulvovaginal Infections in Pregnant Women

Prevention plays an important role in reducing the risk of complications during pregnancy and childbirth. Preventive measures are aimed at maintaining normal vaginal flora, ensuring proper hygiene, and avoiding sexually transmitted infections.

### 2.1. Maintaining Personal Hygiene

- Regular intimate hygiene practices help prevent infections. It is important to use neutral cleaning agents that do not disrupt the natural vaginal flora.

- Avoid frequent use of harsh cleaning products and douching, which can disturb vaginal flora.

### 2.2. Proper Nutrition and Immune Support

- A diet rich in probiotics (e.g., yogurt, kefir) can help maintain healthy vaginal flora.

- Strengthening the immune system through vitamins, especially vitamin C and B vitamins, helps the body fight infections.

### 2.3. Avoiding Risk Factors

- Limiting the number of sexual partners and using barrier methods of contraception (e.g., condoms) can prevent sexually transmitted infections.

- Regular checkups and screening for infections during pregnancy are crucial for timely detection and treatment.

### 2.4. Vaccination

- Vaccination against the human papillomavirus (HPV) before pregnancy can reduce the risk of cervical dysplasia and cancer associated with HPV infection.

By combining appropriate treatment and preventive measures, pregnant women can significantly reduce the risk of vulvovaginal infections and related complications.

**Table: Treatment of Various Vulvovaginal Infections in Pregnant Women**

Type of Infection	Medications for Treatment	Safety During Pregnancy
<b>Candidiasis</b>	Topical antifungals (clotrimazole, miconazole)	Safe, especially after the 1st trimester
<b>Bacterial Vaginosis</b>	Metronidazole, clindamycin	Safe to use, avoid in the 1st trimester
<b>Trichomoniasis</b>	Metronidazole, tinidazole	Metronidazole can be used after the 1st trimester
<b>Gonorrhea</b>	Ceftriaxone	Safe
<b>Chlamydia</b>	Azithromycin, amoxicillin	Safe
<b>Genital Herpes</b>	Acyclovir, valacyclovir	Safe

## Conclusion

Vulvovaginal infections pose a significant concern during pregnancy as they can complicate the gestational process and lead to various consequences. Timely diagnosis, based on clinical symptoms and laboratory tests, helps reduce health risks for both the mother and the fetus. Key diagnostic criteria

include microscopy of vaginal smears, pH determination, as well as microbiological and molecular tests. Regular screenings are recommended for pregnant women to detect and treat infections promptly.

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