

## Vaginal Infections: A Common Gynecologic Disorder

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### ABSTRACT

Vaginal infections are one of the commonest gynecologic disorders. Still, the various types are often misdiagnosed and mixed infections also occur. Hence incomplete relief and recurrences are common. The three commonest types are trichomoniasis, candidiasis and bacterial vaginosis. The aim of our article is to provide an overview of the main types of vaginitis, the causative agents, pathogenesis, diagnostic tests and treatment so as to help improve diagnosis and management.

**Key words:** Vaginal infections, Vaginitis, Vaginal discharge.

### INTRODUCTION

Vaginal infections are one of the commonest gynecologic disorders; so common that every female will experience this problem sometime in her life. Common presentation is vaginal discharge with or without itching. <sup>[1]</sup> Commonest types are trichomoniasis, candidiasis and bacterial vaginosis. <sup>[1,2]</sup> Incorrect diagnosis of the type and presence of mixed infections results in incomplete relief and recurrences. Though serious and long-term sequels are rare but vaginal infections are always distressing to the affected female and need to be addressed. This review has been compiled as a small step in this direction.

#### Normal Vaginal Flora

The microbiology of vagina is determined by vaginal pH and availability of glucose for microbial metabolism. <sup>[2]</sup> These are indirectly related to menstrual cycle variations and hormone levels. <sup>[2]</sup> Estrogen predominance in reproductive age increases superficial vaginal cells, increased glycogen and monosaccharides, increased

lactic acid and decreased pH. <sup>[2]</sup> Luteal phase progesterones increase intermediate cells. <sup>[2]</sup> Absence of either hormones, as in post-menopausal females causes predominance of basal cells. <sup>[2]</sup> There are variations with menstrual cycle but the predominant vaginal flora remains aerobic, hydrogen-peroxide producing lactobacilli. <sup>[1]</sup> Normal vaginal secretions are white and floccular and collect in posterior fornix, which is the most dependent part of vagina. <sup>[2]</sup>

#### Trichomoniasis

Trichomoniasis is the most common non-viral sexually transmitted disease and is caused by a flagellated, parasitic protozoan *Trichomonas vaginalis*. <sup>[2,3]</sup> This urogenital anaerobic pathogen, with a characteristic quivering motility, has very high transmission rates, both male-to female and female-to male. <sup>[2-4]</sup> However, males are usually asymptomatic and females are mostly symptomatic. <sup>[4]</sup> *Trichomonas* is different from other parasitic protozoa because only the trophozoite form exists. <sup>[4]</sup>

It cannot encyst; however, the organism may survive in urine, semen and water for upto 24 hours. [4] Commonest mode of transmission is sexual intercourse but direct skin to skin contact also transmits the infection. [4] The pH, time and temperature dependent adherence of trichomonas vaginalis, specifically to vaginal epithelial cells results in cervico-vaginal epithelial colonization. [4]

Microtubules, microfilaments, adhesins and cysteine proteinases mediate process. [4]

**Clinical features:** Symptoms include yellow-green, profuse, purulent, malodorous vaginal discharge with or without pruritus, dysuria and dyspareunia. [1,2,5,6] Clinical examination reveals vaginal discharge with patchy vaginal erythema and colpitis macularis or strawberry cervix, which is characterized by punctate hemorrhagic lesions. [2,6] Pregnant women are at increased risk of preterm delivery and premature rupture of membranes. [2] Vaginal pH is usually more than 5. [1,2]

**Diagnostic tests include:**

- **Saline microscopy-** Most commonly used method but sensitivity is low (60-70%). [5] Motile trichomonas are diagnostic. [2,5] Numbers of leucocytes are increased in contrast to bacterial vaginosis, where leucocytes are almost absent. [2]
- **Culture-** Has been the gold standard for diagnosis for long. [5,6] Culture media used have been Diamond's TYI medium and cell cultures. [5,6] However, bacterial contamination is a problem besides expenses and non-availability of resources. [6]
- **Nucleic acid amplification tests-** These are highly sensitive but costly. [5,6]

**Treatment:** The drug of choice for treatment of trichomoniasis is Metronidazole in single oral dose (2 grams) or multi-dose (500 mg BD for 7 days) regime. [1,2,5] Non-responders may be given a repeat course or tinidazole may be tried. [2] Cultures and sensitivity tests are advised in resistant cases. [2] Treatment of sexual partners, even if asymptomatic, is advised.

[1,2,5] Barrier contraception may prevent spread of infection. [5] Trichomoniasis increases the susceptibility of the infected female to HIV and also increases the chances of transmitting HIV to her sexual partner. [4,5] Screening for other STI's, syphilis and HIV is recommended. [2]

**Candidiasis**

Vaginal candidiasis or candidal vulvo-vaginitis or vaginal thrush or vaginal yeast infection is caused by a dimorphic fungus *Candida*, whose blastospores are responsible for transmission and asymptomatic colonization and mycelia are responsible for enhanced colonization and tissue invasion. [2,8] *Candida*, in small numbers, is a vaginal commensal. [8] The causative species are *Candida albicans* (commonest, 85-90%), *Candida glabrata* and *Candida tropicalis*. [1,2] Extensive inflammation with minimal invasion is characteristic and suggests presence of an extracellular toxin or enzyme or hypersensitivity reaction as a cause. [2] Hyphal wall protein 1, a mammalian transglutaminase substrate located on hyphal surface, mediates adhesion to host cells and this is the first step for colonization and mucosal invasion. [7] Slr1, an RNA-binding protein also determines virulence. [7] Antibiotic use, pregnancy and diabetes are predisposing factors and immuno-compromised patients (AIDS, cancer chemotherapy and organ or bone marrow transplantation) suffer severe infections and fungemias. [2,7] However, it is not classified as a sexually transmitted infection. [8]

**Clinical features:** Symptoms include vaginal discharge, usually associated with vulvar pruritus. [2] Vaginal soreness, dyspareunia, and splash dysuria may be present. [2] Discharge may be watery to thick, but usually cottage-cheese type. [2] On examination, vagina shows inflammation with adherent discharge. [2] The pH is usually <4.5. [2]

### Diagnostic tests include:

- **Vaginal wet mount microscopy**- reveals budding yeast forms or mycelia. [2,8,9] Adding of 10% potassium hydroxide (KOH) improves visualization. [9] Gram stain is useful. [9]
- **Fungal culture**- in Sabouraud's agar, CHROM agar etc. [8,9] Culture of yeast remains gold standard for diagnosis but positive culture in absence of symptoms or signs is not an indication for treatment because candida is a normal vaginal flora too. [9]
- **Antigen tests**- PCR testing is not FDA-cleared as yet. [8,9]

**Treatment:** Uncomplicated cases usually (80-90%) respond to short-courses of topical formulations. [2,9] Topical azoles (Clotrimazole, Miconazole, Tioconazole, Butoconazole, Terconazole) in single dose to 7-day regimes are prescribed and are more effective than nystatin. [9] Single oral dose of 150mg fluconazole is also effective. [2,9] Complicated candidiasis, which includes recurrent cases, severe candidiasis, non-albicans candidiasis, diabetics and immune-compromised patients, needs a more intensive treatment. [9] Recurrent cases, defined by four or more symptomatic episodes within a year, need a longer initial therapy (like 7-14 days of azoles or fluconazole on day 1,4,7) [2,9] followed by a maintenance regimen of weekly oral fluconazole for up to 6 months. [2,9] Severe cases like those associated with extensive vulvitis are treated with 7-14 days of azoles or two doses of fluconazole, 72 hours apart. [9] Long duration azoles may be tried for non-albicans candidiasis but if recurrence occurs, local 600mg boric acid capsule may be tried. [9] Compromised hosts need longer duration of treatment and correction of modifiable conditions. [9] Pregnant females should be treated with 7-day regime of topical azoles. [2] Treatment of sexual partners is usually not recommended, except in men with balanitis. [2,9]

### Bacterial Vaginosis

Bacterial vaginosis, also known as vaginal bacteriosis, is actually an alteration in normal vaginal flora with replacement of hydrogen-peroxide producing lactobacilli by anaerobic bacteria. [2,10] Inflammation is minimal, hence the name vaginosis in place of vaginitis. Predominant anaerobes are Gardnerella vaginalis and Mycoplasma hominis. [2] Lactobacilli as well as leukocytes are usually absent. [2] Repeated alkalization of vagina, as caused by vaginal douches and repeated sexual intercourse is a predisposing factor. [2] Though it is only an altered vaginal flora, it is associated with many adverse sequelae, especially in pregnancy. [2] There is increased risk of premature rupture of membranes, preterm labor, chorioamnionitis and post-Caesarean infections. [2,10] Bacterial vaginosis increases the risk of other STI's including HIV. [10]

**Clinical features:** Alkaline vaginal pH (more than 4.5) with grayish vaginal discharge thinly coating the vaginal walls and fishy vaginal odour are the main features. [2,10] Pruritus is uncommon. [10]

### Diagnostic tests are:

- **Whiff test**- Characteristic fishy odour on adding potassium hydroxide to wet mount is suggestive. [10]
- **Microscopy**- reveals clue cells with absent leucocytes. [2,10] Clue cells are bacteria-coated vaginal epithelial cells and so named because they give a clue to diagnosis. [10]
- **Amsel's criteria**- three out of four criteria positive required. [10]
  - i. Positive Whiff test.
  - ii. Vaginal pH more than 4.5.
  - iii. Presence of clue cells.
  - iv. Homogenous, thin, white-yellow vaginal discharge.
- Hay/Ison criteria or Nugent criteria based on study of Gram stained vaginal smear. [10]
- **Culture**- not recommended because of lack of specificity. [2]
- **DNA hybridization testing**- not commonly used. [10]

**Treatment:** Metronidazole is the drug of choice. [2,10] Clindamycin is an alternative. [2,10] Macrolides, lincosamides, nitroimidazoles and penicillins may also be tried. [10] It is not a sexually transmitted disease, so treatment of sexual partner is not recommended. [2,10]

### Inflammatory Vaginitis

The clinical syndrome of diffuse exudative vaginitis, epithelial cell exfoliation and profuse purulent vaginal discharge mark the diagnosis of diffuse inflammatory vaginitis. [2,11] Sobel's 5 criteria are helpful for diagnosis. [11] Replacement of lactobacilli with gram-positive cocci has been observed but exact etiology is not clear. [2] This is a rare condition.

### CONCLUSION

Vaginal infections are a common and distressing condition. Understanding the pathophysiology, proper clinical work-up, use of diagnostic aids and appropriate management can help reduce the associated morbidity.

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