

Vaginitis and Its Treatment

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GOALS AND OBJECTIVES

Goals:

To provide the pharmacist with information regarding the various types of vaginal disorders and their therapy.

Objectives:

After completing this article, the pharmacist should be able to:

1. Discuss the typical causes of vaginitis.
2. Understand the normal physiology and abnormal constituents of the vagina.
3. Discuss the major types of vaginitis.
4. Describe the therapeutic regimens to treat the major types of vaginitis.

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Vaginitis is defined as any inflammatory process involving the vagina. It is not a specific disease, but a group of diseases which cause inflammatory alterations in the vagina and vulva and have similar symptoms, such as pain, odor, discharge, itching, and discomfort during sexual intercourse.

Although vaginitis is a common problem which may affect as many as one-third of all women of childbearing age at any particular time, information associated with its etiology, diagnosis and treatment is not always apparent because of the diverse factors related to its occurrence (i.e., allergy, sexual activity, hygiene, differing vaginal flora) as well as the psychosocial aspects and implications felt by the patient.

Constituents and Physiology of the Vagina

The vaginal mucosa has very few nerve endings for pain, so many times involvement of the vulva via the vaginal discharge is necessary before the patient becomes symptomatic. Since both the vagina and vulva are usually involved, vaginitis is usually vulvovaginitis.

Although the vagina contains no secretory glands, adequate lubrication is provided by secretion from glands in the area. The vaginal environment can be altered by many factors, but a major one is hormonal changes. After menopause and before puberty, the epithelium covering the vagina is thin and has minimal glycogen content. In the presence of estrogens, the epithelium becomes layered and large deposits of glycogen are found within the cells. The glycogen is converted to lactic acid by vaginal enzymes, lactobacilla and/or other bacteria.

During the use of oral contraceptives, pregnancy or other states with high levels of progesterone, a relative decrease in glycogen is present. The acidic pH of the vagina is maintained by glycogen and lactic acid production. In the normal menstruating woman, the vaginal pH varies between 4.5 and 5.5 with the most acidic pH occurring at the time of ovulation and premenstrually, when estrogen levels are highest. Most pathological bacteria cannot proliferate in this acidic environment.

In premenarchal and postmenopausal women, the vaginal pH remains a neutral 7. The acid environment may be disrupted by a variety of mechanisms. They include menstrual blood, many of the normal vaginal lubrications and secretions, and

with intercourse, the presence of seminal and prostatic fluids, which are alkaline substances and may cause a transient alkaline pH in the vagina.

The physiological processes occurring in the vagina affect the microbiology of the vagina. Therefore, it is often difficult to ascertain which organisms constitute the normal vaginal flora. The predominant organisms in the vagina in both non-pregnant and pregnant women are the lactobacilli. There are many species of this gram-positive rod and they all have the ability to grow in the high acidity of the vagina, which inhibits growth of other bacteria.

Staphylococcus epidermidis and diphtheroids are also frequently found in the normal vagina. Although all of these organisms are found frequently (i.e., 75 percent), it is difficult to state that any organisms are universally present. *Klebsiella* and *Escherichia coli* are gram-negative organisms that are found most frequently, but this is in less than one-third of the cases. *Bacteroides* species are among the most prevalent anaerobic bacteria present. Vaginal flora is sparse in both the premenarchal and postmenopausal states. Diphtheroids are predominant in the former, while *E. coli* and *Proteus* are the major organisms found in the latter state.

In general, it appears that hormonal production has an important role in the type and amount of vaginal flora present. High estrogen levels are associated with larger amounts of bacteria, while progesterone appears to counteract the estrogen effect by decreasing the bacterial count.

Major Types of Vaginitis

Vaginitis may be caused by an infection resulting from fungi, bacteria and/or parasites. As indicated, the etiology can vary from inadequate hygiene to sexual activities. Noninfectious vaginitis can develop as a result of allergies or irritation from vaginal products (i.e., soaps, sprays). Individuals with diabetes mellitus, those who are pregnant, and/or those under stress appear to have a greater opportunity to have vaginitis.

Organisms commonly associated with the occurrence of vaginitis are candidal species. In some instances, *Candida* may be part of the normal flora and their presence may not always indicate a disease process. Furthermore, since *Candida* are opportunistic organisms, they may be secondary to another organism which is the primary invader. *Candida*

albicans is the most frequent species causing vaginitis. The typical problem is associated with irritation, a creamy discharge along the vaginal wall, and an acidic pH. Diagnosis is determined primarily by specific culture techniques. A major problem with these infections is the high recurrence rate. A variety of predisposing factors, such as pregnancy, diabetes mellitus, and the use of broad spectrum antibiotics, oral contraceptives, and corticosteroids, are associated with difficulty in curing the infectious process. It is also possible that the organism can be transmitted by sexual intercourse, since male partners of females have encountered the organism.

Trichomoniasis is caused by *Trichomonas vaginalis*, a flagellated protozoa which infects the paraurethral glands of both sexes, but is usually not symptomatic in males. Symptoms may occur for several months and are often more apparent after menstruation or during pregnancy. The typical infection is associated with inflammation of the vaginal mucosa and a frothy, yellow alkaline discharge. The infection may also affect the endocervix and bladder.

Nonspecific vaginosis is the current preferred name for vaginitis caused by an organism(s) that accounts for approximately 30 percent of all vaginitis problems. The organism(s) is *Hemophilus vaginalis*, a pleomorphic gram-negative coccobacillus, which is also known as *Corynebacterium vaginale*. Another name for this organism is *Gardnerella vaginalis*. It is present in about half the adult female population and has been isolated from male and female urogenital tracts. The patient usually has a creamy vaginal discharge that has a fishy odor.

Another bacterial organisms that have been implicated in vaginitis include *Neisseria gonorrhoeae*, *E. coli*, various staphylococcal and streptococcal strains, and anaerobic organisms such as *Bacteroides*. *N. gonorrhoeae* is foremost among these and does not actually cause a vaginitis per se, but is usually associated with an ascending salpingitis (inflammation of the uterine tube). There is usually a vaginal discharge which is an asymptomatic complaint that provided the initial reason for evaluation.

Genital herpes is caused by herpes simplex virus. The incubation period averages six days, but can be much longer before symptoms appear. The active infection lasts approximately three weeks with symptoms

peaking during the initial two weeks. Initial symptoms include itching and irritation, but usually there is an ulcerous lesion which may be painful. Other symptoms include those associated with a typical systemic infection and may include fever, chills, vomiting, aching, and fatigue.

Chlamydial organisms are often implicated in genitourinary symptoms in both females and males. Chlamydia is the culprit in more than half of the males diagnosed with nongonococcal urethritis, while it is the cause in greater than 20% of the females with cervicitis. It is difficult to determine whether chlamydia directly cause vaginitis, but they are definitely implicated as a major pathogen in salpingitis.

Atrophic vaginitis occurs in the postmenopausal years as a result of a variety of factors. In some individuals, fewer estrogens are present which eventually results in a decrease in glycogen content, a rise in pH to 6.5 or 7.5 and a reduction in lactobacilli. Symptoms of atrophic vaginitis include a vulvar and vaginal irritation, burning sensation, a thin and inflamed vagina, and an exudate. The exudate contains numerous bacteria which are most frequently coliforms and anaerobic organisms.

Treatment of Vaginal Infections

Many remedies are available to treat vulvovaginal candidiasis. Topical drugs, such as miconazole, clotrimazole, butoconazole, terconazole or tioconazole are effective. These drugs can be used for one day therapy to one week therapy depending on the treatment regimen and severity of disease. Adverse effects include vaginal burning, itching or irritation.

The drug used to treat trichomoniasis in the United States is metronidazole. It is an imidazole derivative and is used orally. Metronidazole is effective against a variety of organisms, including those that cause amebiasis as well as various anaerobic bacteria. A dosage regimen of two grams administered as a single dose or in two divided doses of one gram each given the same day is used for treating trichomoniasis. Another regimen is 250 milligrams three times a day for one week. Adverse effects associated with metronidazole include gastrointestinal distress (i.e., nausea, anorexia, diarrhea, cramping) and headache. Metronidazole may cause a disulfiram-like reaction,

if it is taken with alcohol. The urine may have a brown tinge in patients taking metronidazole.

Treatment of nonspecific vaginosis is often accomplished with metronidazole. Typically, a one week course of oral therapy is used. However, topical clindamycin or topical metronidazole can also be used. Ampicillin and amoxicillin have been used in oral doses for one week with variable success.

Chlamydial infections are usually treated effectively with a tetracycline (e.g., doxycycline for one week). A single dose of azithromycin is also effective. Ofloxacin for seven days is an alternative, particularly if there is a secondary organism present (e.g., *Ureaplasma urealyticum*). Erythromycin is usually used for chlamydia during pregnancy as well as in newborns. Treatment is often continued for two weeks.

Since it inhibits the growth of many fungi and yeasts, gentian violet has been used to treat vaginal candidiasis. However, it is not as effective as many other products and is a dye. Therefore, stain will occur in any areas in which it comes in contact.

Topical sulfonamides are often used to treat *E. coli* and some of the anaerobic organisms. However, the exact sensitivities of these organisms to a specific treatment is difficult to ascertain because their effects may be altered by the vaginal environment.

A variety of therapeutic regimens have been used to treat genital herpes. Ultraviolet light, heterocyclic dyes, and cytarabine are examples of treatments which have been used with variable success. Acyclovir reduces the duration of viral shedding and clinical symptoms. This effect is clearly measurable when oral and/or injectable dosage forms are administered during the initial episodes of genital herpes infection. Acyclovir may impede the herpes virus. Therefore, like other antiviral remedies that have been employed, acyclovir does not cure the infection.

Treatment of atrophic vaginitis is directed toward eradicating the offending organisms as well as enhancing the resistance of the vaginal epithelium to infection. Therefore, vaginal creams containing estrogen and antibacterial sulfonamide creams are used. Once the infection has been eliminated, then estrogen therapy is maintained once or twice weekly intravaginally. The same contraindications exist for

topical estrogen therapy as for oral therapy, since significant serum estrogen levels are attained with topical application.

Clotrimazole and miconazole are now approved for use on a nonprescription basis. This will allow for more self-treatment by women who have experienced vulvovaginal candidiasis.

These drugs should not be used for the initial episode. A physical should evaluate these problems. However, women who have encountered these problems may be able to self-treat the disorder.

The pharmacist should be aware of the signs and symptoms associated with the various forms of vaginal infection in order to adequately counsel patients regarding these drugs.

Conclusion

Vaginitis is a common problem which requires careful evaluation. A complete history and physical are essential to determine the primary source of the problem. Adequate therapy is necessary to eradicate the infection.

The pharmacist can provide an important service by providing drug information and consulting to both patients and health professionals.

References available upon request.

Examples of Drugs Used to Treat Vaginitis

Generic Name	Example of Brand Name
Acyclovir	Zovirax
Ampicillin	Principen
Amoxicillin	Polymox
Tetracycline	Achromycin
Doxycycline	Vibramycin
Dienestrol	DV
Triple Sulfonamides	Sultrin
Miconazole	Monistat
Clotrimazole	Gyne-Lotrimin
Metronidazole	Flagyl
Estrone	Theelin
Butoconazole	Ferristat
Terconazole	Terazol
Tioconazole	Vagistat
Azithromycin	Zithromax
Erythromycin	E-Mycin
Ofloxacin	Floxin
Clindamycin	Cleocin

Signs and Symptoms of Vaginal Infection

	Normal Vaginal Exam	Yeast Vaginitis	<i>Trichomonal Vaginitis</i>	Bacterial Vaginitis
Etiology	Uninfected; <i>Lactobacillus</i> predominant	<i>Candida albicans</i> and yeasts	<i>Trichomonas vaginalis</i>	Associated with <i>G. vaginalis</i> , various anaerobic bacteria, and mycoplasma
Symptoms	None	Vulvar itching and/or irritation; increased discharge	Profuse, purulent discharge, vulvar itching	Malodorous, slightly increased discharge
Discharge	Variable; usually scant	Scant to moderate white fluid	Profuse yellow fluid	Moderate; usually white or gray fluid
Type of Inflammation	None	Erythema of vagina epithelium	Erythema of vaginal and vulvar epithelium	None
Ph of Vaginal Fluid	Usually ≤ 4.5	Usually ≤ 4.5	Usually ≥ 5.0	Usually ≥ 4.7
Microscopic Assessment	Normal epithelial cells; lactobacilli predominant	Leukocytes, epithelial cells and yeast	Leukocytes; motile trichomonads seen in 80-90% of symptomatic patients	Few leukocytes; lactobacilli outnumbered by profuse mixed flora, nearly always including <i>G. vaginalis</i> plus anaerobic species on Gram stain