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VAGINITIS: AN INTENSIVE REVIEW

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ABSTRACT

Vaginitis presents as one of the most common gynaecological disorders for which women seek medical care. Vaginitis is a condition in which the vagina becomes inflamed resulting in pruritis, discharge and pain. The vaginal ecosystem comprises of both pathogenic and non-pathogenic bacteria and this condition results due to the imbalance in the vaginal flora by organisms like yeast, bacteria, parasites or due to irritation from chemicals or sprays. Out of the numerous causes, Bacterial vaginitis (40-50%), vulvovaginal candidiasis (20-25%), and trichomoniasis (15-20%) may be regarded as the frequent causes of vaginitis. Most women suffering from vaginitis refrain from visiting clinics due to the social stigma attached to it and instead opt for self-treatment with over-the-counter drugs which at times may not be the correct mode of treatment. Therefore, to minimise the occurrence of and to contain the spread of vaginitis it is very important for women of all reproductive ages to have an understanding about the disease along with its proper management.

The present review aims to understand the causes, diagnosis and treatment of the most common causes of vaginitis.

Key words: Vaginal flora, Bacterial vaginitis, Vulvovaginal candidiasis, Trichomoniasis, Vaginitis.

INTRODUCTION

Vaginitis maybe defined as the inflammation or infection of the vagina which may be caused due to the disruption of the balance of the bacteria residing in the vagina by organisms like yeast, bacteria, parasites or by irritations from chemicals or sprays. Those affected with this condition experience symptoms such as irritation, burning sensation, itching, foul smell and abnormal discharge from the vagina [1, 2].

Most of the women suffer from vaginitis once they reach maturity. There is a high percentage of women who visit the clinic each year due to complaints of vaginal discharge. Generally, women self-treat vaginal problems with over-the-counter drugs which at time may not be the correct treatment. Therefore, to treat vaginitis, a proper diagnosis and apt treatment is required. Diagnosis usually involves a thorough assessment, wet mount microscopy, testing the vaginal pH, and cultures. Treatment usually involves medication that focuses on the underlying cause of the infection [3].

“Vaginitis” is a general term which encompasses trichomoniasis, vulvovaginal candidiasis and bacterial vaginosis (BV). Around 70% of the patients are diagnosed with these infections. Patients majorly suffer from Bacterial Vaginitis (40% to 50%), some with vaginal candidiasis (20% to 25%), and few with trichomoniasis (15% to 20%) while some remain undiagnosed (30%) due to which they suffer from an array of problems like vulvodynia, atrophic vaginitis, vulvar dermatoses and leukorrhea [4].

THE VAGINAL FLORA

There is a delicate balance of diverse microbial species and metabolites produced by both the host and the microbes in the vaginal ecosystem. The vaginal mucosa contains Glycogen which acts as a precursor for lactic acid, which is required for a healthy vagina. This Glycogen is converted into a simpler carbohydrate like glucose so that it can be utilized by the bacteria, nonbacterial enzymes, or both present in the vagina. Apart from glycogen and glucose the vaginal flora consists of acids, proteins, nucleic acids and fatty acids from degrading bacteria [4,5,6].

Both pathogenic and non-pathogenic microbial species are found in the vaginal microflora at a ratio of approximately 1: 200. If the balance is maintained, the non-pathogenic bacteria remain dominant but if the balance is disrupted then the pathogenic bacteria take over the dominance and causes bacterial vaginitis.

Healthy vagina is maintained by certain Lactobacillus species and they do so by secreting some necessary substances. Lactobacillus thrives well at a pH of more than 4.5, but may also thrive at a pH of 3.8 to 4.5. The remaining populations of the vaginal microflora either exhibits a poor growth rate or does not grow at a pH of 4.0 to 4.5 and they do not survive at a pH less than 4.0.

These non- pathogenic bacteria impede pathogenic bacteria in the following ways:

1. By producing organic acids (lactic acid), which helps in maintaining the pH at a range of 3.8 to 4.2.
2. By producing Lactocin.
3. By secreting hydrogen peroxide [4].

PATHOGENIC BACTERIA	NON-PATHOGENIC BACTERIA
<i>Gardnerella spp.</i>	<i>Lactobacillus crispatus</i>
<i>Escherichia coli</i>	<i>Lactobacillus casei</i>
<i>Enterobacter agglomerans</i>	<i>Lactobacillus gasseri</i>
<i>Enterobacter aerogenes</i>	<i>Lactobacillus insers</i>
<i>Enterobacter cloacae</i>	<i>Lactobacillus jensei</i>
<i>Morganella morganii</i>	<i>Nonhemolytic streptococci</i>
<i>Mycoplasma spp.</i>	<i>Streptococcus viridans</i>
<i>Ureaplasma spp.</i>	<i>Staphylococcus epidermidis</i>
<i>Haemophilus influenzae</i>	<i>Klebsiella oxytoca</i>
<i>Streptococcus agalactiae</i>	<i>Klebsiella pneumonia</i>
<i>Enterococcus faecalis</i>	<i>Proteus mirabilis</i>
<i>Peptococcus niger</i>	<i>Proteus vulgaris</i>
<i>Peptostreptococcus anaerobius</i>	<i>Eubacterium spp.</i>
<i>Fusobacterium necrophorum</i>	<i>Corynebacterium spp.</i>
<i>Fusobacterium nucleatum</i>	<i>Veillonella spp.</i>

Table 1: Pathogenic and non-pathogenic bacteria found endogenously in a healthy vaginal microenvironment [4]

CAUSES OF VAGINITIS

Bacterial vaginitis (40-50%), vulvovaginal candidiasis (20-25%), and trichomoniasis (15-20%) are the frequent causes of vaginitis. Non-infectious vaginitis is less frequent and accounts for 5% to 10% of the cases and includes causes like atrophic, irritant, allergic, and inflammatory vaginitis [6].

INFECTIOUS	NON-INFECTIOUS
Common causes ➤ Bacterial vaginitis ➤ Vulvovaginal candidiasis ➤ Trichomoniasis	➤ Hypersensitivity, Contact dermatitis and Allergy ➤ Chemical or other irritants ➤ Vaginal atrophy ➤ Traumatic vaginitis ➤ Post natal Vaginal atrophy ➤ Erosive genital lichen planus ➤ Idiopathic vaginitis ➤ Behçet's syndrome, Collagen vascular disease, pemphigus syndrome
Less frequent causes ➤ Secondary bacterial infection along with Vaginal atrophy ➤ Streptococcus associated vaginitis (group A) ➤ <i>Staphylococcus aureus</i> associated Ulcerative vaginitis ➤ Toxic shock syndrome ➤ HIV infection associated Idiopathic vulvovaginal ulceration.	

Table 2: Causes of Vaginitis [6]

BACTERIAL VAGINOSIS

The most common cause of vaginitis in women of reproductive age is Bacterial vaginosis and is characterized by vaginal discharge that is white or grey in colour, unpleasant vaginal odour, the discharge has a consistency similar to milk and in rare cases it may be accompanied by vaginal itching or burning. This happens when the normal vaginal lactobacillus species get replaced with anaerobic bacteria which in turn causes a decrease in the organic acid level and hydrogen peroxide level in the vagina [9, 10]. Unpleasant vaginal odour arises due to amine production by the anaerobic bacteria [11]. It has been reported that the intensity of the odour increases after intercourse as the presence of semen makes the vagina more alkaline and also during menstruation (due to the presence of blood) [10].

Bacterial vaginosis increases the susceptibility of the patient to endometritis and pelvic inflammatory disease [12]. If pregnant women are infected with Bacterial Vaginosis, then they are more liable to give birth to a baby with low birth-weight and may even have pregnancy complications [13]. It has also been reported that women suffering from both symptomatic and asymptomatic bacterial vaginosis are at a higher risk of contracting human immunodeficiency virus (HIV)-1. [14].

Causative organism: The causative organism of Bacterial Vaginosis (BV) includes *Gardnerella vaginalis*, *Mycoplasma hominis* and other anaerobic bacteria like *Prevotella* sp and *Mobiluncus* sp. [2]

DIAGNOSIS

Out of the four Amsel's criteria, at least three must be positive to obtain diagnosis of BV. The four criteria are:

- pH of discharge >4.5.
- Clue cells in saline wet mount or Gram stain of vaginal discharge.
- Thin homogeneous discharge.
- Vaginal discharge and 10% KOH mixture should liberate a "fishy" odor that is "amine-like" [15].

TREATMENT

For the treatment of symptomatic bacterial vaginosis, antibiotics are prescribed. Antibiotic therapy also decreases the incidence of HIV and STIs as well as infections arising after abortion and hysterectomy.

The following antibiotics are generally used:

- Metronidazole such as Flagyl and Metrogel-Vaginal (orally medication).
- Tinidazole such as Tindamax (oral medication).
- Clindamycin, such as Cleocin and Clindesse, a medication that can be inserted into the vagina [9].

VULVOVAGINAL CANDIDIASIS

Vulvovaginal candidiasis is a condition in which the mucosa of the lower female reproductive tract is infected mostly by *Candida albicans* (around 90%) and in some cases by *Candida glabrata*. It is characterized by the presence of the fungus *Candida* either in the

vagina or in the vulva and is also accompanied by itching, irritation, inflammation and dysuria. “Candidiasis” refers to vaginal yeast infection [16].

Candida albicans, is a part of the normal human microbiome which can be found in the lumen of the vagina without any manifestations. However, due to the overgrowth of the fungus in the vagina it may lead to the inflammation of the mucosa and successive invasion of the epithelium. It generally accompanied by symptoms such as discharge, irritation, and severe pruritis of both the vulva and vagina. 3 out of 4 women are affected by Candidiasis at some point in their life. Vulvovaginal candidiasis is an infection that is not transmitted sexually but there is a higher chance of acquiring this infection during regular intercourse. However, there is an increased risk of this infection at the time of regular sexual activity [17].

Causative organism: The main cause of this infection is a yeast called *Candida albicans* that causes 90% of the cases while the remaining 10% is caused by *Candida glabrata* [16].

DIAGNOSIS

Some symptoms of vulvovaginal candidiasis include itching, coitalgia, vaginal soreness and discharge of the vagina. These symptoms although common are but specific. The diagnosis depends on:

- The nature of the discharge of vagina (i.e., curd-like discharge),
- Antigen or DNA probe testing
- Gram staining and treatment of the discharge with KOH may be done to check the presence of pseudohyphae and yeast cells [1, 18].

TREATMENT

Oral antifungal agent (like fluconazole) or Intravaginal agents (like butoconazole, clotrimazole, nystatin, terconazole) may be prescribed for the treatment of this disease [9].

TRICHOMONIASIS

Trichomoniasis is a common sexually transmitted infection (STIs) throughout the world that is caused by a parasite *Trichomonas vaginalis*. Women with trichomoniasis suffer from an unpleasant smelling vaginal discharge, urethral discharge, pruritis of the genitals and dysuria while men with trichomoniasis suffer only from dysuria. Pregnant women are at a

higher risk of delivering premature babies if they acquire this infection. In order to prevent reinfection with *Trichomonas vaginalis* both partners need to be treated [19].

Causative organism: Trichomoniasis is caused by a flagellated protozoa *Trichomonas vaginalis* which is shaped like a pear and has a typical wobbly and rotating movement and identifying this protozoan on a wet mount forms an important criterion in diagnosis [1, 19].

DIAGNOSIS

Diagnosis is based upon checking the characteristics of the discharges (like frothy, creamy and unpleasant smelling) linked with hyperemia of the vagina and dysuria.

The symptoms alone cannot suffice diagnosis hence a doctor will ask the patient for physical examination and laboratory tests. Some of the tests that can be used to diagnose trichomoniasis include:

- Culture of the Vaginal cells
- Microscopic examination of the sample of urine, vaginal fluid and urethral discharge
- Antigen tests
- Tests which determine the presence of trichomonas DNA
- Nucleic acid amplification test for high-risk women [1, 9]

TREATMENT

Treatment of trichomoniasis can reduce the symptoms and transmission to partners. In persons infected with HIV, treatment may also decrease the transmission of HIV to partners. For most people the treatment usually comprises of antibiotic therapy which can be given either in a single large dose or in several small doses like Metronidazole (Flagyl, Nuversa, Noritate) and Tinidazole (Tindamax). The medication should be continued if the health of the patient starts to improve.

Antibiotic treatment helps in the elimination of the parasite but the chances of re-infection is still there as studies suggest that around 20% of the people have been re-infected within 3 months of the treatment. Most men are asymptomatic hence there is a high chance that they may act as a carrier of this parasite back to their female counterpart. The transmission rate of this infection from a male that is asymptomatic to their female mating partners can be lowered by the usage of condoms. Nevertheless,

treatment both the male and female sexual partners is the best way to avoid reinfection [1, 9, 20].

Bacterial Vaginosis	Vulvovaginal Candidiasis	Trichomoniasis
Initial treatment: ✓ Metronidazole: 500mg twice a day for seven days; oral administration ✓ Metronidazole 0.75% gel: (5g) One full applicator; intravaginal application for 5 days. ✓ Clindamycin 2% cream: (5g) One full applicator; intravaginal application during bedtime for 1 week.	Initial treatment: Topical azole therapy like ✓ Butoconazole 2% cream: 5g once a day for three consecutive days; intravaginal application. ✓ Butoconazole (2%) sustained release cream: Single dose; 5g intravaginally. ✓ Miconazole 2% cream: 5g once a day for 1 week; intravaginal application. ✓ Nystatin vaginal tablet: once daily; 100,000-unit vaginal tablet for 14 days. ✓ Fluconazole: 150mg orally, single dose.	Initial treatment: ✓ Tinidazole: Single dose; 2g orally. ✓ Metronidazole: Single dose; 2g, orally.
Alternate treatment: ✓ Tinidazole: Oral administration; 2g	Alternate treatment: ---	Alternate treatment: ✓ Metronidazole: 500mg orally,

per day for two days. ✓ Tinidazole: Oral administration; 1g per day for five days. ✓ Clindamycin: Oral administration; 300mg two times a day for 1 week. ✓ Clindamycin (100mg): Intravaginal application; before bed for three consecutive days.		twice a day for 1 week.
Pregnancy*: ✓ Metronidazole (500mg): two times per day; oral administration; for a week ✓ Metronidazole (250mg): three times per day; oral administration; for a week. ✓ Clindamycin (300mg): two times per day; oral	Pregnancy*: ✓ Topical azole intravaginally for 1 week.	Pregnancy*: ✓ Metronidazole: 2g orally, single dose.

administration; for a week.		
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Table 3: Treatment regime for Bacterial vaginitis, Vulvovaginal candidiasis and Trichomoniasis [1, 9].

*-The pros and cons of the treatment should be discussed in the cases of pregnant patients (after 37 weeks of conception).

CONCLUSION

Vaginitis is one such gynaecological disorder that afflicts a woman once in their life time. Although this is a common disorder, women in many parts of the world shy-away to report and seek treatment for it. They usually self-treat themselves with over-the-counter drugs without taking into consideration the cause of the disorder. This in many cases may lead to wrong treatment, further worsening the condition.

If correct diagnosis and treatment is provided then this disorder can be managed easily and further complications can be prevented.

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