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Bacterial Vaginosis

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Introduction

Bacterial vaginosis is a condition caused by an overgrowth of normal vaginal flora.[1] Most commonly, this presents clinically with increased vaginal discharge that has a fish-like odor.[1] The discharge itself is typically thin and either gray or white.[1] After being diagnosed with bacterial vaginosis, women have an increased risk of acquiring other sexually transmitted infections (STI), and pregnant women have an increased risk of early delivery.[2][3][4]

Etiology

Although bacterial vaginosis is not contagious, the role of transmissibility is yet to be completely understood. The spread of bacteria among individuals through sexual intercourse may alter the natural balance of bacterial flora within the vagina, and this imbalance appears to lead to the development of bacterial vaginosis.[5] Typically, this condition is caused by a decrease in the number of normal hydrogen peroxide-producing *Lactobacilli* with an overgrowth of anaerobic bacteria.[6][2]

Historically, bacterial vaginosis was called *Gardnerella* vaginitis because it was believed that this bacterium was the cause of this condition.[1] However, the newer name, bacterial vaginosis, helps to highlight the fact that a variety of different bacteria that naturally live in the vagina may grow in excess and cause the condition.

Epidemiology

Bacterial vaginosis is the most common vaginal infection found in women of reproductive age and is estimated to occur in anywhere from 5% to 70% of women.[4] Interestingly, worldwide this condition is most common in parts of Africa and is found to be least common in Asia and Europe.[4] In the United States, about 30% of women ages 14 to 49 are affected.; however, rates are variable between different ethnic groups and are most common in non-white women (51% African American, 32% Mexican Americans).[7][8]

Epidemiological data had shown that women are more likely to report bacterial vaginosis if they have had multiple sexual partners, are unmarried, began to engage in intercourse at a young age, if they are commercial sex workers, or if they practice regular douching.[4]

Pathophysiology

Bacterial vaginosis is caused by an imbalance of the naturally occurring vaginal flora, characterized by both a change in the most common type of bacteria present, as well as an increase in the total number of bacteria present.[2] The *Lactobacilli* species dominate normal vaginal microbiota.[2] Bacterial vaginosis is associated with a decline in the overall number of Lactobacilli.[2] Although still uncertain, it is thought that most bacterial vaginosis infections start with *Gardnerella* vaginalis creating a biofilm which then allows other opportunistic bacteria to grow within the vagina.[9]

The association between BV and an increased risk for future STIs stems from the fact that BV allows the potential for other vaginal pathogens to gain access to the upper genital tract.[1] BV is also responsible for the presence of enzymes that reduce the ability of host leukocytes to fight infection, and for an increased release of endotoxins that stimulate cytokine and prostaglandin production within the vagina.[1]

Histopathology

The hallmark of this diagnosis relies on examination of vaginal fluid on a wet mount under a microscope.[10] Bacterial vaginosis is characterized by the presence of clue cells, which are epithelial cells of the cervix that are embedded with rod-shaped bacteria.[10]

History and Physical

Most women with bacterial vaginosis present with a complaint of malodorous vaginal discharge.[10] Often this becomes more pronounced after sexual intercourse. Additional symptoms may include dysuria, dyspareunia, and vaginal pruritus, however many affected women, may be asymptomatic.[5]

The clinician should elicit pertinent history regarding the risk factors for this disease, as well as, a previous history of bacterial vaginosis infections.[5] The risk factors for bacterial vaginosis include vaginal douching, multiple sexual partners, recent antibiotic use, cigarette smoking, and the use of an intrauterine device.[3] For this reason, the U.S. Department of Health and Human Services strongly discourages the use of vaginal douching.[5] Having a female sexual partner increases the risk of bacterial vaginosis by 60%; it is important to note that bacterial vaginosis itself is not an STI.[5] By definition, an STI is caused by a source that is not endogenous to the vaginal flora.[5] Since bacterial vaginosis is caused by an overgrowth of normal vaginal bacteria, it does not meet the definition of an STI.[10] Furthermore, bacterial vaginosis can be present in patients who have never had sexual intercourse.

A proper physical exam must include a pelvic exam to examine the characteristics of the vaginal discharge and to help exclude other similarly presenting diseases, including candidiasis, cervicitis, chlamydia, gonorrhea, herpes simplex virus, and trichomoniasis.[5] In addition, bacterial vaginosis itself is a risk factor for pelvic inflammatory disease, HIV, STIs, and other obstetric disorders.[10] Therefore, it is important to assess for cervical friability and cervical motion tenderness as well.

It is important to assess for fever, pelvic pain, and a history of sexually transmitted infections to rule out the more serious conditions that remain on the differential diagnosis.[5] Cervical swabs may be sent to investigate the presence of chlamydia or gonorrhea infection.

Since the presence of clue cells are thought to be the most reliable diagnostic sign of bacterial vaginosis, it will be necessary to examine the vaginal fluid under a microscope.[5] This diagnostic step can also help to rule out the presence of yeast or trichomonads.[10] It is important to note that many of these diseases can occur concomitantly, so it is necessary to scan the entire specimen for the presence of clue cells even if another pathology is identified.[5] Testing the vaginal fluid pH can also assist in the diagnosis of bacterial vaginosis.[5]

Evaluation

Diagnosis of bacterial vaginosis is typically suggested clinically and confirmed by obtaining a vaginal swab of the cervical region or discharge and creating a wet mount slide to review under a microscope.[11] The swab may contain a higher than normal vaginal pH (greater than 4.5), the presence of clue cells on wet mount, and a positive whiff test.[11] To determine the vaginal pH, pH paper can be utilized and compared to color controls.[11] To identify clue cells, a drop of sodium chloride solution is placed on the wet mount slide, and the slide is examined under the microscope for visualization of the characteristic clue cells.[11] The whiff test is performed by adding a small amount of potassium hydroxide to the microscopic slide containing the vaginal discharge and is considered to be positive if a characteristic fishy odor is revealed.[11] Typically, two of these positive tests in addition to the presence of the characteristic discharge is enough to confirm the diagnosis of bacterial vaginosis.[11] If no discharge is present, then all three of these criteria are needed to make the diagnosis.[1][12]

In clinical practice, bacterial vaginosis is often diagnosed by the Amsel criteria.[11] At least three of the four criteria are needed to confirm the diagnosis.[11] The Amsel criteria include a thin white, a yellow homogenous discharge, clue cells on microscopy, pH of vaginal fluid more than 4.5, and the release of a fishy odor after adding an alkali solution (10% KOH) to the specimen.[11] The modified Amsel criteria accept the presence of just two of the above factors, and research has shown that this is equally diagnostic.[11] The sensitivity and specificity of the Amsel criteria are 70% and 94%, respectively.[11]

Alternatively, a gram-stain of the vaginal fluid can be done to examine the predominant strain of bacteria. This

technique is referred to as the Nugent process.[11] Data have shown that this technique has a sensitivity and specificity of 89% and 83%, respectively, but it rarely is used in clinical practice.[12]

Treatment / Management

Although up to 30% of bacterial vaginosis cases may resolve without treatment, this condition can also be treated with either clindamycin or metronidazole.[4] Both of these medications are effective if taken by mouth or applied vaginally. Additionally, both are safe to use in pregnant women.[4] About 10% to 15% of women do not improve after the first course of antibiotics and may require additional treatment. Because this is not considered to be an STI, partners do not need to be treated, and there is no risk of passing the infection back and forth between partners.[10] A 2016 Cochrane review found high-quality evidence that treating the sexual partners of women with bacterial vaginosis did not affect symptoms, clinical outcomes, or the recurrence of affected women. [13][14][15]

Some studies have suggested that pregnant women who are symptomatic from bacterial vaginosis should be treated with clindamycin before 22 weeks of gestation to reduce the risk of labor before 37 weeks of gestation.[11] However, no clear consensus has been made whether to screen for or treat bacterial vaginosis in the general population to prevent adverse outcomes such as preterm birth. To date, screening for bacterial vaginosis in asymptomatic women is not recommended, but testing and treatment of symptomatic women is indicated.[11]

Unfortunately, it has been shown that recurrence may occur in up to 80% of women after treatment.[11] If a patient presents with recurrent symptoms, a second course of antibiotics is typically prescribed. A 2009 Cochrane review found tentative but insufficient evidence to support the use of probiotics as treatment or prevention of bacterial vaginosis.[11]

Differential Diagnosis

A proper physical exam can help to narrow down the differential diagnosis and help to exclude other similarly presenting diseases, such as herpes simplex virus.[5] Speculum exam can examine for cervicitis, and a wet mount of the vaginal discharge can look for candidiasis or trichomoniasis.[5] Additional cervical swabs can be cultured for chlamydia and gonorrhea.

Pearls and Other Issues

Untreated BV can lead to increased risk of STIs including HIV and pregnancy complications.[7] In fact, BV appears to increase the risk of subsequent chlamydia or gonorrhea infection by 1.9 and 1.8-fold, respectively. Research has shown that HIV-infected women found to have BV are more likely to transmit HIV to their sexual partners than those without BV.[7] Furthermore, BV has been shown to be associated with up to a six-fold increase in HIV shedding.[7][16][8] BV is also a risk factor for herpes simplex virus type 2 infection and the increased risk of infection or reactivation of human papillomavirus. Recent literature has shown that BV predicts HPV persistence, implying that treating even asymptomatic BV in women with HPV co-infection may be warranted.

During pregnancy, BV has been associated with a two-fold increased risk of preterm delivery (particularly if BV is diagnosed in the early second trimester) and a three to five-fold increased risk of spontaneous abortion in women diagnosed with BV in the first trimester.[6] It has been shown to also increase the risk of chorioamnionitis, premature rupture of membranes, and postpartum endometritis.[6] Data suggest an association between BV and tubal factor infertility, and the prevalence of BV is significantly higher in infertile women (45.5%) when compared to fertile women (15.4%).[6] Additionally, studies have shown that women with BV who later receive in vitro fertilization have a lower implantation rate and higher rates of early pregnancy loss.[6]

Enhancing Healthcare Team Outcomes

BV is a common presentation in clinical medicine. Healthcare workers and nurse practitioners who see patients with BV should always assess for the presence of other STIs. In addition, BV during pregnancy is known to be associated with a high rate of preterm delivery and spontaneous abortions.[6] Thus, the importance of screening for BV during pregnancy.[6] The outcomes for women who get treated for BV are good but failure to treat often has high morbidity.

Continuing Education / Review Questions

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