bacterial vaginosis

Making the diagnosis: Vaginal infections

ABCDs of bacterial vaginosis

Considerations for partner therapy in patients with BV

ON THE CASE
Recurrent bacterial vaginosis

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Editor-in-chief's introduction

Dear Colleagues,

We are pleased to be able to offer our readers this special supplemental issue on bacterial vaginosis (BV). Together, the authors of the articles in this issue provide a comprehensive review of the prevalence, etiology, risk factors, adverse sequelae, differential diagnosis, and management of this common vaginal infection. Readers can find the latest information about the healthy vaginal microbiota, and about how changes in this microbiota and development of a polymicrobial biofilm may contribute to persistent or recurrent BV. Relevant quality-of-life (QOL) concerns, especially for individuals who experience recurrent BV, are addressed. In addition, the issue regarding whether treatment of same-sex partners of women with BV may reduce recurrence rates is discussed.

There is a thread of recognition throughout these articles that effective treatment of recurrent BV can be challenging. We do know more about BV and the vaginal microbiota than we did several years ago. Nevertheless, more research is needed. In The ABCDs of Bacterial Vaginosis: Abnormal Flora, Bothersome Symptoms, Chronicity, and Differential Diagnosis, Alisa Pascale describes some of the novel biofilm-disruptive agents being investigated as treatments for recurrent BV. In Considerations for Partner Therapy in Patients with Bacterial Vaginosis, Diane Bruessow focuses on the unmet needs of women who have sex with women (WSW) with regard to prevalence and recurrence rates of BV. The author proposes that there is growing evidence to support consideration of treatment of asymptomatic female partners who test positive for BV, especially in cases of recurrent BV among monogamous same-sex partners. Comprehensive evidence-based guidelines for the treatment of BV in WSW are not yet available.

In her Focus on Sexual Health column entitled Bacterial vaginosis: Impact of sexual activity, implications for sexual health, Brooke M. Faught outlines co-morbidities and potential adverse gynecologic and obstetric sequelae of BV. She elucidates what we know and do not know about the role of BV in the increased risk for acquiring and transmitting sexually transmitted infections. The author also provides qualitative data reinforcing the adverse effect that BV, particularly recurrent BV, can have on sexual health QOL. In my own article, Making the Diagnosis: Vaginal Infections, I review currently available and recommended diagnostic tests for BV and other vaginal infections.

Finally, this special supplemental issue features two useful patient education materials about BV that were created by NPWH. One is a patient handout in Q&A format and the other is an infographic. Readers are encouraged to photocopy these materials and distribute them to their patients.

Nurse practitioners providing women’s healthcare see women on a regular basis who have BV—the most common vaginal infection in reproductive-age women. I hope you find the articles in this special issue useful in your practice and in educating your patients about BV and vaginal health.

Beth Kelsey, EdD, APRN, WHNP-BC, FAANP

Beth Kelsey, EdD, APRN, WHNP-BC, FAANP
Making the diagnosis: Vaginal infections

By Beth Kelsey, EdD, APRN, WHNP-BC, FAANP

Most women experience at least one vaginal infection characterized by vaginal discharge, itching, and/or odor during their lives. In women who present with these vaginal symptoms, the three most common conditions are bacterial vaginosis, vulvovaginal candidiasis, and trichomoniasis. In some cases, more than one vaginal infection is present. A problem-focused history, physical examination, and laboratory evaluation are necessary for accurate diagnosis. The author describes characteristic findings for these vaginal infections and discusses currently available diagnostic tests.

Although a health history by itself is unreliable for making a vaginal infection diagnosis, it can provide valuable information to guide physical examination and laboratory test decisions. The focused health history includes a description of the characteristics of the vaginal discharge, a sexual history, vaginal hygiene practices (e.g., douching), and previous history of vaginal infections and sexually transmitted infections (STIs). Healthcare providers (HCPs) should ask the patient whether she has used any medication or other products to treat her current symptoms, as well as the outcome of the treatment. In addition, HCPs should inquire about the date of the patient’s last normal menses and the presence of any spotting or bleeding between menses. A sexually active patient should be asked about postcoital spotting or bleeding, dyspareunia, and use of contraception. HCPs should review current medications and allergies.

The physical exam includes inspection of the vulva, vagina, and cervix. HCPs should evaluate the vulva and vagina for erythema, edema, and lesions. The cervix is inspected for signs of cervicitis that may be the source of abnormal discharge. HCPs should note vaginal discharge characteristics such as color, viscosity, adherence to vaginal walls, and presence of odor, and should collect a specimen of the discharge from a lateral wall of the vagina for evaluation under a microscope. If the patient has risk factors for an STI or signs of cervicitis (e.g., mucopurulent discharge, friability), HCPs should collect a specimen from the endocervix for chlamydia and gonorrhea testing. In-office diagnostic tests include measurement of vaginal pH, wet mount microscopy, and an amine odor test (whiff test). In addition, point-of-care and laboratory-based diagnostic tests are available. Table 1 lists signs, symptoms, and various in-office test results for the differential diagnosis of vaginal discharge.1-3

Review of diagnostic tests
The most common in-office tests used to aid in the diagnosis of vaginal infections are a pH test of the vaginal discharge, wet mount microscopic inspection, and a whiff test. Also available are organism-specific point-of-care tests, which have higher sensitivity and equal or higher specificity than those of the wet mount. In some cases, laboratory tests may be indicated for diagnosis.
Vaginal pH

The pH of vaginal fluid can be determined by placing a strip of pH litmus paper directly on the wall of the vagina or placing discharge from a collection swab on the strip. As an alternative, HCPs can dip the strip into discharge pooled on the upper blade of the speculum. HCPs should avoid using discharge from the posterior vaginal fornix, which might be mixed with cervical secretions and could possibly affect the pH.1-3

The normal pH of the vagina is between 3.8 and 4.5. A vaginal pH less than 4.5 is consistent with physiologic discharge or vulvovaginal candidiasis (VVC). A vaginal pH greater than 4.5 predicts a diagnosis of bacterial vaginosis (BV) or Trichomonas vaginalis infection. When VVC and a concomitant BV or T. vaginalis infection occur, the vaginal pH may be above 4.5. Other factors that can cause an elevated pH include atrophic vaginitis or contamination of the specimen with blood, semen, or urine. A woman who is immediate postpartum, lactating, or menopausal may have an elevated vaginal pH due to reduced systemic estrogen levels. Because vaginal pH testing is not highly specific, the results must be interpreted within the context of a patient’s symptoms, physical exam findings, and wet mount findings.1-4

Wet mount

Healthcare providers use a cotton swab to obtain the specimen for a wet mount from the lateral vaginal wall—avoiding contamination with cervical secretions. The wet mount slide can be made by placing a drop of warm 0.9% saline and a drop of the vaginal discharge specimen directly onto it. As an alternative, the swab used to collect the specimen can be placed into a test tube containing less than 1 mL of saline and stirred gently, with a drop of the mixture placed onto a slide. HCPs then place a cover slip over the solution on the slide, followed by immediate examination under a microscope at both low (10x) and high (40x) power. The slide is thoroughly scanned for clue cells and motile trichomonads. Delays of more than 10 minutes in viewing the wet mount significantly reduce the chance of visualizing motile trichomonads required for diagnosis.3

Healthcare providers then place a second sample of the vaginal dis-
charge specimen on a slide and add a drop of 10% potassium hydroxide (KOH) solution. After mixing the sample with the wooden end of the cotton swab or a spatula, HCPs can bring the slide near the nose to perform the whiff test; the presence of a strong amine or fishy odor is considered a positive result. A positive whiff test is consistent with a diagnosis of BV, although it may also be present with *T. vaginalis* infection. After performing the whiff test, HCPs place a cover slip over the preparation on the slide, followed by examination under the microscope. KOH destroys most of the cells and bacteria, but it does not significantly affect any fungal organisms, thereby making it much easier to visualize pseudohyphae and spores. Pseudohyphae seen on the wet mount confirm the presence of *Candida albicans*. *C. glabrata* strains may form spores, but not pseudohyphae, making wet mount detection more difficult.3

Readers can view an excellent video on wet mount microscopy developed by the Seattle STI/HIV Prevention Training Center here. Figures 1, 2, and 3 show microscopic images of clue cells, trichomonads, and pseudohyphae/spores, respectively.

**Amsel criteria**

Amsel criteria for the diagnosis of BV combine findings from vaginal pH, wet mount microscopy, the whiff test, and characteristics of the vaginal discharge seen on speculum exam. Presence of three of these four criteria provides sufficient evidence for a clinical diagnosis of BV:

- vaginal pH >4.5;
- positive KOH whiff test result;
- clue cells (must constitute ≥20% of vaginal epithelial cells viewed on saline wet mount microscopy); and
- homogeneous, milky-white discharge adherent to vaginal walls.1

**Point-of-care tests**

FDA-approved point-of-care tests offer the convenience of prompt diagnosis of vaginal infections, along with sensitivity superior to and specificity equal to or better than those of wet mount evaluation. Some tests provide the option for self-collection or clinician collection of vaginal specimens. Point-of-care tests are more expensive than the combination of pH testing, whiff testing, and vaginal microscopy. Therefore, some HCPs may choose to use point-of-care tests only if the traditional in-office tests do not reveal the most likely cause of a patient’s symptoms or a microscope is not available. The OSOM® Trichomonas Rapid Test detects *T. vaginalis* antigens; live organisms are not necessary to make the diagnosis.5,6 The OSOM® BVBlue® Test detects elevated activity of vaginal fluid sialidase, an enzyme produced by BV-associated organisms such as *Gardnerella vaginalis, Bacteroides* species (spp), *Prevotella* spp, and *Mobiluncus* spp.7 The vaginal discharge sample for both of these tests can be self-collected or clinician collected. Results are available within 10 minutes.

The BD Affirm™ VPIII Microbial Identification Test is a non-amplified molecular test that detects *T. vaginalis, various Candida* spp, and high concentrations of *G. vaginalis*.8 This DNA probe-based test requires only one specimen obtained with a sterile swab for all three organisms. To conduct this point-of-care test, HCPs must purchase an automated processor that can run six specimens simultaneously in about 45 minutes. Unless the clinical site does high-volume testing, the expense overrides the convenience.

**Nucleic acid amplification tests (NAATs)**

Laboratory testing technology for both vaginal and cervical infections has shifted from cultures to NAATs that use molecular-based techniques. These tests are designed to amplify nucleic acid sequences (DNA or RNA)
that are specific for the organism being detected. NAATs can detect live or nonviable organisms. Several different NAAT-based methods are available, including transcription-mediated amplification (TMA) and polymerase chain reaction (PCR).

The FDA-approved Aptima® Trichomonas vaginalis Assay is an NAAT (TMA) that is highly specific and considerably more sensitive than wet mount, culture, or the Affirm VP III point-of-care test. The CDC recommends NAAT as the preferred test for the diagnosis of trichomoniasis. The specimen for the test can be from a self- or clinician-collected vaginal swab, a urine sample, or an endocervical sample collected and placed in a specified liquid cytology medium. The BD MAX™ Vaginal Panel test, an FDA-approved NAAT (PCR), detects the microorganisms responsible for causing BV, trichomoniasis, and VVC. The panel identifies several Candida spp; the most common species, when present, are reported as a group, whereas C. glabrata and C. krusei are reported separately. The panel utilizes a BV algorithm that quantifies the ratio of organisms specific to BV infections to normal vaginal bacteria, including lactobacilli. A self- or clinician-collected vaginal swab is used to obtain a specimen for this test.

Several NAAT assays test for Neisseria gonorrhoeae, Chlamydia trachomatis, and T. vaginalis on the same sample.

**Cultures**

Cultures can detect both Candida spp and T. vaginalis. Although a yeast culture is not usually necessary to make a diagnosis of VVC, it may be useful when a wet mount is negative for pseudohyphae or spores but a patient has symptoms and discharge or other signs suggestive of VVC on exam. When a woman has recurrent or persistent symptoms of VVC, a culture can help confirm the diagnosis and identify the species of yeast, if present. However, a culture is of no value if a woman has recently used antifungal treatment. Culture for T. vaginalis is more sensitive than wet mount but less sensitive and more expensive than NAAT. Culture for BV is not recommended because no bacteria are specific to BV. Although cultures for G. vaginalis are positive in almost all women with symptomatic BV, the organism is detected in up to 50%-60% of healthy asymptomatic women; therefore, its presence alone is not diagnostic of BV. An option for clinical settings that lack a microscope or point-of-care testing for BV is to send a vaginal discharge specimen to a laboratory for Gram stain diagnosis.

**Pap test**

A Pap test may identify Candida spp in about 25% of patients with symptomatic VVC. Because cells evaluated on a Pap test are from the cervix and not as likely to be affected by VVC, the Pap test is not sensitive for this purpose. If Candida spp are found on a Pap test of an asymptomatic woman, treatment is not required. For T. vaginalis, the Pap test has a specificity of 96% with liquid-based tests and 92% with slide-based tests. However, it has a low sensitivity—similar to that of a wet mount (51%-65%).

**Implications for clinical practice**

When a patient presents with vaginal infection symptoms, making an accurate diagnosis is important so that appropriate treatment can be prescribed. In most cases, the combination of a problem-focused health history and physical exam, along with vaginal pH, wet mount microscopy, and whiff testing, provides sufficient information to pinpoint the cause of a patient's symptoms. Point-of-care and laboratory tests are available if the diagnosis remains uncertain. When HCPs do not take the time to fully evaluate possible causes of a patient's symptoms, the result may be persistent symptoms that adversely affect quality of life, repeat visits, overuse of unnecessary antimicrobial medications, and increased healthcare costs.

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NPs; and NPWH Director of Publications, Washington, DC. She states that she does not have a financial interest in or other relationship with any commercial product named in this article.

References
7. OSOM® BVBlue Test (sialidase activity) BV: 90.3 BV: 96.6 Results available in about 10 minutes
8. BD Affirm™ VPIII Microbial Identification Test BV: 90.5-90.7 BV: 84.5-85.8 T. vaginalis: 99.3 Candida spp: 91.9-94.1 G. glabrata: 99.6-99.7 Insignificant variations between self- and clinician-collected specimens
9. Aptima® Trichomonas vaginalis Assay BV: 90.3 BV: 93.3-100 T. vaginalis: 99.3-100 NAAT recommended by CDC

Web resource
A. youtube.com/watch?v=8dgeOPGzX1Y

Table 2. Sensitivity and specificity of various vaginal infection diagnostic tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH test</td>
<td>BV: 77-90.3</td>
<td>BV: 35-74</td>
<td>Based on BV pH &gt;5, T. vaginalis pH &gt;5.4</td>
</tr>
<tr>
<td>Wet mount</td>
<td>BV: 71-74</td>
<td>BV: 86-89.5</td>
<td>Highest levels for VVC are with KOH prep vs. saline prep</td>
</tr>
<tr>
<td>Amsel criteria</td>
<td>BV: 51-65</td>
<td>BV: 97-100</td>
<td>≥3 of 4 criteria met</td>
</tr>
<tr>
<td>OSOM® Trichomonas Rapid Test</td>
<td>T. vaginalis: 82-95</td>
<td>T. vaginalis: 97-100</td>
<td>Results available in about 10 minutes</td>
</tr>
<tr>
<td>OSOM® BVBlue Test</td>
<td>BV: 90.3</td>
<td>BV: 96.6</td>
<td>Results available in about 10 minutes</td>
</tr>
<tr>
<td>Aptima® Trichomonas vaginalis Assay</td>
<td>T. vaginalis: 95-100</td>
<td>T. vaginalis: 93.3-100</td>
<td>NAAT recommended by CDC</td>
</tr>
<tr>
<td>Affirm™ VPIII Microbial Identification Test</td>
<td>G. vaginalis: 83.5</td>
<td>G. vaginalis: 96</td>
<td>Results available in about 45 minutes</td>
</tr>
<tr>
<td>BD MAX™ Vaginal Panel test</td>
<td>BV: 90.5-90.7</td>
<td>BV: 84.5-85.8</td>
<td>VVC: 77 -97</td>
</tr>
<tr>
<td></td>
<td>T. vaginalis: 93.1-93.2</td>
<td>T. vaginalis: 99.3</td>
<td>VVC: 77 -97</td>
</tr>
<tr>
<td></td>
<td>Candida spp: 79.3</td>
<td>Candida spp: 95.9</td>
<td>VVC: 77 -97</td>
</tr>
<tr>
<td></td>
<td>G. glabrata: 75.9-86.7</td>
<td>G. glabrata: 99.6-99.7</td>
<td>VVC: 77 -97</td>
</tr>
</tbody>
</table>

BV, bacterial vaginosis; KOH, potassium hydroxide; NAAT, nucleic acid amplification test; VVC, vulvovaginal candidiasis.
**Bacterial Vaginosis**

**KNOW THE FACTS**

**What is bacterial vaginosis (BV)?**

BV is an infection that develops when levels of “good” bacteria and “bad” bacteria in the vagina are unbalanced. It is very common. More than 21 million women in the U.S. are affected every year.

**What’s the problem?**

A fishy odor and an increase in discharge are the primary symptoms of BV. Irritation or a burning sensation in or around the vagina is also possible.

**Do I have it?**

BV can be confirmed only by visiting your HCP, who will do a pelvic exam to look for signs of BV and take samples of the discharge for tests. The vaginal discharge will be checked for the telltale signs of BV by use of a microscope in the office or by sending the sample to a lab.

**How is it treated?**

BV is treated with antibiotics in oral pills or granules or in vaginal creams, gels, or suppositories. If you take antibiotic pills, you may experience side effects such as upset stomach or nausea, and should not drink alcohol. Your HCP may also advise you to not have sex until treatment is complete.

**How did I get it?**

Anything that disrupts the natural balance of your vaginal bacteria can increase your risk of getting BV.

- Using soaps or deodorant sprays
- Having sex
- Having naturally low levels of “good” bacteria

**Can I prevent it?**

The best way to prevent BV is to practice good vaginal care. The inside of the vagina is self-cleaning, and does not need to be washed. To feel fresh and clean, wash the outside daily with warm water. Make sure any soap you use is hypoallergenic and fragrance-free. Do not douche or use deodorant sprays. Wear cotton underwear to keep the area cool.

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Readers are invited to photocopy Patient Education pages in the journal and distribute them to their patients.

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Bacterial vaginosis (BV) is a common condition that results from a shift in the balance of a woman’s vaginal microflora. BV is manifested by a decrease in predominantly hydrogen peroxide-producing lactobacilli and an increase in anaerobic bacteria. The depletion of lactobacilli leads to a rise in vaginal pH, and enzymes produced by the anaerobes lead to some of the classic symptoms associated with BV. Before the article’s main focus on the ABCDs of BV—abnormal flora, bothersome symptoms, chronicity, and differential diagnosis—background information on BV prevalence, risk factors, and adverse sequelae is provided and the characteristics of a healthy vaginal environment are described.

**Background information**
Prevalence of BV varies widely from country to country, from region to region within the same country, and even within similar population groups. A systematic review and meta-analysis showed that BV was significantly associated with sexual contact with new and multiple male and/or female partners. The precise relationship between sexual activity and BV development is not known. General consensus among vaginitis experts is that BV can be sexually associated, but that it is not considered to be sexually transmitted at this time. Two studies showed that women with genital herpes or HIV infection had an increased risk of developing BV. Also, BV acquisition has been associated with douching.

**Prevalence**
A systematic review by Kenyon et al. suggested that BV prevalence ranged from 6% to 51% in the United States, depending on race, ethnicity, and geographic area. Based on a representative sample of U.S. women who participated in the National Health and Nutrition Examination Survey (NHANES) 2001-2004, overall BV prevalence in this country was 29% among women aged 14-49 years, making it the most common vaginal infection in this age group. According to this NHANES survey, non-Hispanic white women had lower rates of BV (23%) than did African American women (51%) or Mexican American women (32%).

**Adverse sequelae**
Many studies have shown BV to be
a risk factor for acquiring HIV infection, herpes, gonorrhea, chlamydia, and trichomoniasis. BV also may play a role in the development of pelvic inflammatory disease and cervicitis, as well as in the persistence of human papillomavirus infection and in the development of cervical precancerous lesions. In pregnant women, BV may increase the risk for miscarriage, chorioamnionitis, preterm birth, and postpartum endometritis. BV was reported to be 3 times more prevalent among infertile women than fertile women, and it doubled the risk for pregnancy loss following in vitro fertilization-embryo transfer. Of note, Nasioudis et al. posited that most links between BV and adverse pregnancy outcomes have been derived from inadequately designed studies that did not fully evaluate other causes of pregnancy-related pathology.

Because BV is asymptomatic in many cases and because its presence increases the risk for a variety of adverse sequelae in pregnant women, healthcare providers (HCPs) may wonder about screening routinely for BV in this population. At present, the U.S. Preventive Services Task Force, the American College of Obstetricians and Gynecologists, and the CDC do not recommend routine screening for BV in asymptomatic pregnant women.

Early screening and treatment for BV may be considered in women at high risk for preterm birth, although no clear criteria/characteristics have been defined. Pregnant women with any vulvovaginal complaints or symptoms should be evaluated for BV and treated if BV is present.

Characteristics of a healthy vagina
A healthy vagina’s microbiota is characterized by a dominance of lactobacilli, which maintain the acidic vaginal pH at 4.0-4.5. The makeup of a healthy vagina in one woman may differ from that in another. The vagina may be colonized by one or more species of lactobacilli, including Lactobacillus crispatus, L. gasseri, L. iners, and L. jensenii. Furthermore, the composition of the vaginal microbiota is not static; many women experience large variations within a single menstrual cycle or between successive cycles, as well as over time. Hydrogen peroxide and lactic acid produced by these lactobacilli and other vaginal flora enhance the antimicrobial immune response. Some healthy women have low numbers of vaginal lactobacilli and high numbers of other lactic acid-producing bacteria and/or variable concentrations of anaerobic bacteria that have been associated with BV. The percentage of apparently healthy asymptomatic women with a vaginal microbiota not dominated by lactobacilli is higher among women with African and/or Hispanic heritage, who also have a higher vaginal pH than do white or Asian women.
Abnormal vaginal flora

Although *Gardnerella vaginalis* is the best known pathogen linked to BV, the condition is associated with at least a dozen other species (spp) as well, including *Atopobium vaginae, Ureaplasma urealyticum, Mycoplasma* spp, and others. Absence of localized inflammation associated with infection by any of these bacteria is the basis for the term *vaginosis* rather than *vaginitis*.

Vaginal biofilms are well-described microbial communities embedded in a self-produced extracellular matrix to which other species also can adhere. In one study, *G. vaginalis* comprised 90% of bacteria in the biofilm and *A. vaginae* accounted for most of the remainder. This biofilm makes abnormal flora more resistant both to the vagina’s own natural defenses and to antibiotics, likely accounting for the frequency with which women have persistent and recurrent infections.

Bothersome symptoms

Many women with BV are asymptomatic and do not learn of this diagnosis until they undergo a routine gynecologic examination by an HCP who notes the typical signs. But many women with BV do have signs and symptoms, typically a thin white or gray vaginal discharge; itching or burning in the vagina; a strong fish-like odor; especially after sex; burning when urinating; and/or itching around the outside of the vagina. Many women associate BV onset with recent sexual activity, which can cause embarrassment and self-consciousness and prompt some to change or limit their sexual relationships or activities. Self-help remedies such as douching may only exacerbate the problem.

Making the diagnosis

The telephone is not an effective tool for diagnosis of BV. Because patient self-diagnosis and telephone triage diagnosis are notoriously inaccurate, women experiencing any of the aforementioned vaginal signs/symptoms, particularly recurrent symptoms, should see their HCP for an evaluation and clinical diagnosis.

Physical examination

On physical exam of women who may have BV, the external genitalia usually appear normal, although a thin milky discharge may be present at the introitus. The characteristic vaginal discharge is thin, homogeneous, and white, gray, or even yellow. A fishy/amine-positive odor may be perceptible. In many women with BV, physical exam findings can appear normal.

Office-based testing

In the clinical setting, BV diagnosis is made based on Amsel criteria:

- Vaginal pH >4.5;
- Homogeneous white, gray, or even yellow (milky) discharge;
- Release of an amine (fishy) odor after addition of 10% potassium hydroxide (KOH) solution to the vaginal fluid; and
- Presence of clue cells on saline wet prep microscopy.

At least three of these four criteria must be met to make the diagnosis. Vaginal pH paper, saline, KOH, slides, and a microscope are all that are needed to make a quick office diagnosis of BV. This testing is inexpensive and can often yield a diagnosis at the time of the visit, facilitating treatment.

Other laboratory tests

Several commercial products such as the BD Affirm™ VP III Microbial Identification System and the OSOM® BVBlue® point-of-care testing can identify the microbes present in a patient’s vaginal fluid. Use of such a product adds cost to the visit and can delay diagnosis. Of note, BV diagnosis should not be made solely on the basis of a positive *G. vaginalis* culture because this bacterium is present in ~50%-80% of healthy, asymptomatic women. Positive test results should be interpreted in the context of the entire clinical picture to make the diagnosis.

This biofilm makes abnormal flora more resistant both to the vagina’s own natural defenses and to antibiotics, likely accounting for the frequency with which women have persistent and recurrent infections.

Treating symptoms and infection

According to the CDC, the benefits of BV therapy in nonpregnant women are symptom relief and infection cure. Another potential benefit is a reduction of the risk of acquiring a sexually transmitted infection.

Multiple-dose regimens

For a single episode of BV, the CDC recommends these regimens:

- Metronidazole 500 mg orally twice daily for 7 days OR
- Metronidazole gel 0.75%, 1 full applicator (5 g) intravaginally, once daily for 5 days OR
- Clindamycin cream 2%, 1 full applicator (5 g) intravaginally at bedtime for 7 days.
Alternative regimens include the following:42:
- tinidazole 2 g orally once daily for 2 days OR
- tinidazole 1 g orally once daily for 5 days OR
- clindamycin 300 mg orally twice daily for 7 days OR
- clindamycin ovules 100 mg intravaginally once at bedtime for 3 days.

With regard to treatment with nitroimidazoles such as metroni-
dazole and tinidazole, users should abstain from alcohol use for 24 hours after completion of the antibiotic regimen to avoid the chance of a disulfiram-like reaction. Clindamycin cream and ovules are oil based and might weaken latex condoms and diaphragms for 3-5 days after the regimen is completed.

Novel agents that disrupt the vaginal biofilm, including antisepsics, probiotics/prebiotics, plant-derived compounds, natural antimicrobials, acidifying/buffering agents, and DNases, are being investigated as treatments for recurrent BV.

**Single-dose regimens**

Because a medication regimen requiring fewer doses may improve adherence, several different single-dose regimens are available. Single-dose intravaginal regimens include clindamycin 2% cream (Clindesse®) and metronidazole gel 1.3% (Nuvessa®); these intravaginal products are not recommended for pregnant women and are less effective than multiple-dose regimens.43,44 Secnidazole 2 g (Solosec™), a novel, single-dose oral product, was approved by the FDA in 2017 and has been available since 2018. Secnidazole is formulated as a packet of granules that are sprinkled onto applesauce, yogurt, or pudding and then consumed.45,46 Unlike metroni-
dazole, this product has no warning to avoid alcohol consumption. An FDA pregnancy category has not yet been assigned for secnidazole. Although single-dose treatments are well liked by patients, they tend to increase out-of-pocket cost.

**Chronic/recurrent BV**

Chronic or recurrent BV is defined as three or more episodes per year.47 The recurrence rate may be as high as 80% in some populations.48 As discussed previously, the underlying mechanism of the shift to abnormal flora in BV is not well understood. In addition, to date, no treatments target the biofilm, leading to challenges in resolving chronic cases. Women express considerable frustration, embarrassment, and distress with recurrences and the need for repeated or ongoing treatment.37 Until novel treatment options come along, treatment regimens for recurrent BV aim to first treat the current infection and then suppress recurrence(s). HCPs should treat the current infection as per CDC guidelines—that is, with one of the recommended or alternative regimens.

Some experts suggest extending the initial course of oral metroni-
dazole from 7 to 10 days in patients with recurrent BV.49 The addition of boric acid (compounded 600 mg vag-
inally x 21 days) to the initial course of oral nitroimidazole may improve results.49,50 Another option is high-
dose metronidazole (compounded 750 mg vaginally x 7 days), which has a higher cure rate than does the 500-
mg dose.51 Once the current infection is treated, a regimen of metronidazole vaginal gel 2%, 1 applicator intravag-
inally twice weekly for 4-6 months, has shown efficacy in suppressing or preventing recurrences.31 All of the regimens discussed in this paragraph are prescribed off label.

Because BV is a sexually associated infection, condom use may prevent BV recurrences and should be sug-
gested to patients with recurrent BV. Probiotics are popular with patients; two particular lactobacilli strains—L. rhamnosus and L. reuteri—taken orally for 30 days, may help reduce BV recurre-
nces.52 However, strong evidence of lactobacilli benefit for the treatment or prevention of recurrent BV is lack-
ing. Novel agents that disrupt the vaginal biofilm, including antisepsics, probiotics/prebiotics, plant-derived compounds, natural antimicrobials, acidifying/buffering agents, and DNases, are being investigated as treatments for recurrent BV.53 Mar-
razzo et al.54 have described a novel boric acid-based vaginal anti-infective with enhanced anti-biofilm activity (TOL-463) that may show promise for treating recurrent BV in the future.

**Differential diagnosis**

Bacterial vaginosis is distinctive in terms of the characteristics of the vagi-
nal discharge, the fishy odor, the ele-
vated vaginal pH, and the presence of clue cells on wet prep. Nevertheless, other conditions and diseases bear similarities to BV and may need to be ruled out. For example, the genitouri-
inary syndrome of menopause may present with an elevated vaginal pH and a shift in vaginal flora. Correction of the underlying low estrogen state with local estrogen or acidic vaginal moisturizers may sometimes correct the vaginal dysbiosis without a need for antibiotics. Coexistence of candi-
Diagnosis with BV, or as a result of antibiotic treatment for BV, should be considered. Desquamative inflammatory vaginitis is a less well known condition that can be confused with BV because it causes pH elevation, vaginal discharge, and loss of lactobacilli. Diseases and conditions that may need to be considered due to their overlapping symptomatology or their coexistence with BV are listed in the Table, along with recommended treatments.55-58

### Conclusion

Many women are unfamiliar with the condition of BV, which is far more common than women or their HCPs may realize. BV involves a disruption in healthy vaginal microflora and is not always symptomatic, but it can have major adverse sequelae. In addition, recurrence rates are high and are quite bothersome for many women. Standard treatment includes metronidazole or clindamycin, although new treatments are emerging. More research is needed for both better understanding of BV pathogenesis and new and novel treatment options.

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### References

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### Table. Bacterial vaginosis: Differential diagnosis

<table>
<thead>
<tr>
<th>Disease or condition</th>
<th>How it resembles BV</th>
<th>How it differs from BV</th>
<th>Recommended treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichomoniasis*</td>
<td>Frequently asymptomatic; if S/S are present, they may include vaginal discharge, strong fishy odor, itching (less common in BV); high pH</td>
<td>With BV, fishy odor is often worse during menses or after sex. Trichomoniasis is an STI. Discharge is usually yellow/green/gray and frothy, many WBCs are seen on wet prep, and itchiness occurs in vaginal or vulvar area.</td>
<td>One 2-g dose of oral metronidazole or one 2-g dose of oral tinidazole; alternative regimen, metronidazole 500 mg BID x 7d</td>
</tr>
<tr>
<td>Genitourinary syndrome of menopause</td>
<td>May be asymptomatic; S/S include vaginal discharge, change in odor, elevated pH</td>
<td>The underlying mechanism is a loss of estrogen’s effect on vaginal tissues, which can result in vaginal dryness and irritation, dyspareunia, and dysuria.</td>
<td>Local vaginal estrogen products (tablet, insert, ring, cream) or OTC acidifying vaginal moisturizers</td>
</tr>
<tr>
<td>Gonorrhea*</td>
<td>Frequently asymptomatic; if S/S are present, they may include vaginal discharge</td>
<td>Gonorrhea is an STI. Common S/S are pain and burning while urinating and intermenstrual bleeding.</td>
<td>One 250-mg dose of IM ceftriaxone and one 1-g dose of oral azithromycin</td>
</tr>
<tr>
<td>Chlamydia*</td>
<td>Abnormal vaginal discharge</td>
<td>Chlamydia is an STI. A common symptom is a burning sensation when urinating.</td>
<td>One 1-g dose of oral azithromycin or doxycycline 100 mg orally BID x 7d</td>
</tr>
<tr>
<td>Desquamative inflammatory vaginitis</td>
<td>Vaginal discharge, odor</td>
<td>S/S include dysuria, dyspareunia. The discharge is usually profuse and mucopurulent and sometimes bloody, with many WBCs present.</td>
<td>Clindamycin vaginal gel qhs x 14d or compounded hydrocortisone vaginal suppositories, 100 mg qhs x 14-30d, then qod x 2-4 weeks, and then 2/weekly (either treatment used off label)</td>
</tr>
</tbody>
</table>

*Can be distinguished from BV by culture or PCR/NAA testing. BV, bacterial vaginosis; IM, intramuscular; NAA, nucleic acid amplification; OTC, over-the-counter; PCR, polymerase chain reaction; S/S, signs/symptoms; STI, sexually transmitted infection; WBC, white blood cell.


56. CDC. Gonorrhea. Page last updated October 6, 2017. cdc.gov/std/gonorrhea/default.htm


Recurrent bacterial vaginosis

By Beth Kelsey, EdD, APRN, WHNP-BC, FAANP

What can a nurse practitioner do for a woman who has been treated “countless times” for BV?

Factors that alter the vaginal microbiome increase the risk for bacterial vaginosis (BV) by causing a shift in the vaginal microbiota from lactobacillus-dominated bacteria to a variable mixture of anaerobic and facultative bacteria. These factors include, but are not limited to, sexual behaviors (e.g., frequent vaginal intercourse, multiple male or female sex partners, new sex partner, lack of condom use), hormonal fluctuations, smoking, douching, and antibiotic use. Protective factors may include having a male partner who is circumcised and use of hormonal contraceptives.

Recent studies have detected a polymicrobial biofilm in the vaginal epithelial cells of some women with BV that aids in bacterial persistence and enhances resistance to host defense mechanisms and antibiotics. This biofilm also may inhibit normal shedding of vaginal epithelial cells needed to provide glycogen as a nutrient source of lactobacilli, further disrupting the healthy vaginal microbiota. The trigger for the change in the vaginal microbiota and the development of the biofilm remains elusive, but it may contribute to persistent or recurrent BV.

This case report portrays the assessment and management of a woman with recurrent BV.

Bea, a 35-year-old woman, presents at the clinic as a new patient with a complaint of bad-smelling vaginal discharge—again. She states that she just wants a cure that lasts. She tells the nurse practitioner (NP) that she has been treated countless times for BV over the past several years, with temporary relief before the odor and discharge return.

What additional information would be helpful for the NP to obtain?

Bea tells the NP that she has been treated for BV 3 times in the past year, each time with oral metronidazole for 7 days. Her symptoms resolve for a month and then recur when she has a period. The odor is worse after sex. Bea is married and in a monogamous relationship with her husband of 10 years and knows that BV is not a sexually transmitted infection (STI), but she wonders whether he should be treated. Bea admits to douching after sex sometimes to try to eliminate the odor. She is in good health overall, is of normal weight, does not smoke, and is on no medications. She has had no abnormal Pap test results and has never had an STI. Her husband had a vasectomy 3 years ago. They do not use condoms.

A pelvic exam reveals a malodorous thin gray discharge at the vaginal introitus and adhering to the vaginal walls. No erythema or lesions are noted. Vaginal pH is >5.0 and a wet prep shows clue cells, no yeast buds/hyphae, no trichomonads, and no lactobacilli. A potassium hydroxide (KOH) whiff test result is positive. A diagnosis of BV is made based on the presence of at least three Amsel’s criteria: homogeneous thin gray/white discharge, positive whiff test result with 10% KOH, vaginal pH >4.5, and clue cells on microscopy. A confirmatory test is not needed. Diagnosis based on identification of Gardnerella vaginalis on vaginal culture is insufficient; G. vaginalis is detected in up to 55% of healthy asymptomatic women. Based on Bea’s history and exam findings, the NP does not order any STI tests.

What is the recommended treatment plan?

The NP acknowledges Bea’s frustration with her recurring symptoms. The NP explains that although data on treatment for recurrent BV are not conclusive, several options have been cited in the literature based on limited studies. The NP and Bea develop a treatment plan but agree that they will consider other options as needed. The plan is to treat the current BV infection with metronidazole 500 mg orally twice daily for 7 days, followed by 0.75% metronidazole gel intravaginally twice weekly for 4 months to reduce the risk for recurrence, with cessation of vaginal douching.
The trigger for the change in the vaginal microbiota and the development of the biofilm remains elusive, but it may contribute to persistent or recurrent bacterial vaginosis.

In addition to oral metronidazole, the CDC recommends intravaginal metronidazole gel 0.75% once daily for 5 days or intravaginal clindamycin cream 2% at bedtime for 7 days to treat BV. Alternative regimens are tinidazole 2 g orally once daily for 2 days, tinidazole 1 g orally once daily for 5 days, or clindamycin 300 mg orally twice daily for 7 days. Secnidazole, a single-dose granule formulation with no warning to avoid alcohol consumption, was approved by the FDA in 2017 for treatment of BV and has been available since 2018. The granules are mixed with soft food such as applesauce, yogurt, or pudding and then consumed within 30 minutes.

Limited studies support the use of 0.75% metronidazole gel twice weekly for 4-6 months after completion of treatment for the current infection to reduce recurrences. The benefit may not persist after discontinuation.

Several interventions to reduce or eradicate bacteria associated with BV and to restore and maintain a normal vaginal microbiome have been proposed based on limited and sometimes conflicting studies. Among these interventions are the use of biofilm-disruptive agents such as intravaginal boric acid; probiotics to boost favorable lactobacilli species; hormonal contraception to improve the genital microenvironment through increased glycogen production in vaginal epithelial cells, promoting lactobacilli species growth as well as reduction of menstrual bleeding; male and female partner treatment; condom use; and suppressive antimicrobial therapy.

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Web resource
A. npwomenshealthcare.com/author-guidelines/

We invite readers to submit interesting and elucidating case reports. Please see our Guidelines for Authors for more information about this short-form article option.
Considerations for partner therapy in patients with bacterial vaginosis

By Diane Bruessow, PA-C, MPAS, DFAAPA

Bacterial vaginosis (BV), a common disruption of the vaginal microflora and the leading cause of vaginal discharge and malodor, has many earmarks of a sexually transmitted infection (STI). Yet BV is not classified by the CDC as an STI; instead, it is considered a sexually associated infection. With regard to BV treatment, the CDC recommends it for symptomatic women, but not for asymptomatic women. Although current guidelines do not support treating sexual partners of women with BV, healthcare providers (HCPs) should be aware of the existing relevant data and the needs of specific patient populations in order to make informed treatment decisions in this regard.

Prevalence by sexual behavior and identity

Bacterial vaginosis is prevalent among all sexually active women and is even more commonly seen in women who have sex with women (WSW). BV also has been diagnosed in women reporting sexual inexperience, albeit at lower rates than in women reporting sexual experience. An analysis of data from the 2001-2004 National Health and Nutrition Examination Survey (NHANES) showed that overall BV prevalence among women aged 14-49 years was 29%. For women who reported a history of having a female sexual partner, the prevalence jumped to almost 45.2%.

In a systematic review and meta-analysis of 43 studies, Fethers et al. identified a 1.6 relative risk for BV among women with new or multiple male partners and a 2.0 relative risk among women with one or more female partners during their lifetimes. Evans et al. conducted a cross-sectional BV prevalence study of 171 women who identified as lesbian and 189 women who identified as heterosexual in a community setting in the United Kingdom; 354 of the participants had gradable flora. BV was identified in a significantly greater proportion of lesbian women than heterosexual women (25.7% vs 14.4%; adjusted odds ratio, 2.45; 95% confidence interval [CI], 1.25-4.82; \( P = .009 \)). Concordance of vaginal flora within lesbian sexual partnerships was significantly greater than expected (27/31 couples, or 87%; kappa = 0.63; \( P < .001 \)). Another recent systematic review of 22 studies of BV and STIs in WSW found that the most frequently reported condition was BV, with a prevalence ranging from 26% to 43%.

Some data suggest that the rate of BV recurrence may also be higher in WSW than in women who do not have sex with women. In a study on BV recurrence rates over 12 months after treatment, Bradshaw et al. identified a 1.6 relative risk for BV among women with new or multiple male partners and a 2.0 relative risk among women with one or more female partners during their lifetimes.

Key words: bacterial vaginosis, partner therapy, WSW, women who have sex with women, sexually transmitted infection
found that having female sexual partners was significantly associated with BV recurrence. In another study by Bradshaw and colleagues⁸ on recurrence of BV and post-treatment sexual activity, data showed that risk for BV recurrence was significantly increased by having the same pre-/post-treatment sexual partner. Additional data are needed to more definitively determine BV recurrence rates among WSW.

Healthcare providers should keep in mind that sexual identity (e.g., lesbian, bisexual, straight) is not always in synch with sexual behavior. Results from the 2011-2013 National Survey of Family Growth revealed that among 55,271 women aged 18-44 years who were interviewed, 17.4% reported lifetime same-sex sexual behavior.⁹ And yet, in this same group, only 1.3% described themselves as lesbian and 5.5% as bisexual. The incomplete concordance between reported same-sex sexual behavior and sexual identity is important for HCPs to consider when discussing sexual health concerns such as BV with their patients. Specific sexual behaviors that place women at risk for BV should be included in the sexual history, regardless of sexual identity.

### Risk factors for BV

Among all women, risk factors for BV include having new or multiple male sex partners, nonuse of condoms with male partners, having female sex partners, douching, a lack of vaginal lactobacilli, and a history of STIs.⁵,¹⁰ Among WSW, additional risk factors for BV include a higher number of sexual partners, having a female partner with BV, use of a vaginal lubricant, sharing sex toys, a history of forced vaginal penetration, and engaging in digital-vaginal sex and/or digital-anal sex.⁶,¹¹-¹³

### Support for bacterial vaginosis as a sexually transmitted infection

The CDC does not classify BV as an STI.¹ However, for WSW, BV meets the basic definition of an STI based on the transfer of bodily fluid during sex that contains BV-associated bacteria. Whether or not BV is classified as an STI, it is clearly associated with sexual behavior, and evidence for sexual transmission is growing. In a study of 21 pairs of monogamous female sexual partners, of 11 index women who had BV, 8 (72.7%) had sexual partners who also had BV.¹⁴ By contrast, of 10 index women who did not have BV, 1 (10%) had a sexual partner with BV. The probability of a partner having BV if the index case also had BV was 19.7 times higher (P <.008).

In another study of 36 WSW who reported one or more female sexual partners within the prior year, the likelihood of a female sexual partner having BV was 11.4 times greater if the index case had BV (95% CI, 2.9-44.3; P <.0001).¹³ In a longitudinal study of 298 WSW, if a female sexual partner had BV symptoms, subjects had a 3.99-fold increased risk for BV (95% CI, 1.39-11.45).¹⁵ An 8-fold increased risk of incident BV (95% CI, 2.89-19.95) was identified among women with a new female sexual partner within 90 days. Risk of BV incidence was greatly reduced among WSW with a monogamous female sexual partner and/or a BV-negative partner.¹⁵

Finally, although a single pathogen for transmission has not been isolated, a high level of concordance of BV-associated pathogens is observed in monogamous lesbian couples with BV.¹⁰,¹²,¹⁶,¹⁷
Unmet healthcare needs among women who have sex with women

On the basis of six studies conducted in the 1980s and 1990s that failed to show partner treatment was beneficial, the CDC advises against treating sex partners of women diagnosed with BV.10 However, these studies focused on treatment of male sexual partners, had methodologic limitations, and utilized suboptimal treatments. Research needs to be updated utilizing treatment regimens consistent with the current standard of care.10

No current guidelines specifically address treatment of BV in WSW. Even among women who have biologic evidence of BV, current guidelines recommend treatment only for those who are symptomatic.1 Transmission of infection from asymptomatic women with BV to female sexual partners may be a factor in the higher BV prevalence and high recurrence rate among WSW.3,7 The effectiveness of strategies to reduce transference of vaginal secretions between female sexual partners, as well as treatment of female sexual partners of infected individuals, has not been adequately studied. This information is key to the development of evidence-based guidelines for treatment of BV in WSW.18

Research on general gynecologic healthcare needs of WSW is also lacking, resulting in suboptimal understanding among HCPs about how to communicate with WSW about sexual health. Lack of access, discrimination, and stigma persist against sexual minority women despite greater societal openness about sexual diversity. In addition, some HCPs may not fully recognize the potential health risks for WSW. Diagnostic missteps, including erroneous patient self-diagnosis, are likely occurring, leading to inappropriate treatment and recurrence.6,19

Many WSW lack knowledge about the risk of BV and STIs, their symptoms and transmission, and their treatment.20 For example, myths about oral or intravaginal probiotics curing BV still exist. In addition, WSW may hesitate to disclose their same-sex sexual attraction, behaviors, and/or identities to their HCPs, which can inhibit HCPs’ ability to offer nonjudgmental communication, counseling, and appropriate treatment.5

Addressing unmet needs

In addition to improving awareness of WSW’s healthcare needs and educating HCPs about how to effectively communicate with WSW, WSW need additional education about BV risk factors, symptoms, and means of transmission. For instance, WSW should be counseled about the use of barrier devices such as dental dams and female condoms; hygienic practices for the use of sex toys, including anything used for vaginal penetration; signs and symptoms of STIs and BV; and avoiding contact with a sexual partner’s menstrual blood or genital lesions.6

Conclusion

Healthcare providers should consider whether BV should be classified as an STI, which carries an inherent stigma, when discussing the higher BV prevalence and high recurrence rate among WSW.3,7 The effectiveness of strategies to reduce transference of vaginal secretions between female sexual partners, as well as treatment of female sexual partners of infected individuals, has not been adequately studied. This information is key to the development of evidence-based guidelines for treatment of BV in WSW.18

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Conclusion

Healthcare providers should consider whether BV should be classified as an STI, which carries an inherent stigma, when discussing
the condition with WSW. More important is for HCPs to discuss what is known and not known about transmission of BV between female sexual partners, along with risks and benefits of specific treatment regimens. BV has an adverse impact on quality of life and a potentially adverse sequela. Although no current studies of partner treatment in WSW are available, it seems reasonable to offer treatment to asymptomatic female sexual partners who test positive for BV, especially in cases of recurrent BV. One day, guidelines will evolve to enable better understanding of BV in WSW so that best practices can be implemented.

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What is bacterial vaginosis?
A healthy vagina has lots of good bacteria and a few bad bacteria. Bacterial vaginosis (BV) is a vaginal infection that begins when the normal population of bacteria in the vagina becomes unbalanced, resulting in lots of bad bacteria and few good bacteria. BV is very common and any woman can get it. In fact, more than 21 million women in the United States get BV every year. You don’t hear much about BV because many women are embarrassed to have a vaginal infection and don’t talk about it.

How does someone get BV?
The truth is that we don’t really know why some women get BV. A healthy vagina has many different types of bacteria, which are usually kept in a careful balance—with mostly good bacteria present. Anything that disrupts the natural balance of bacteria in your vagina can increase your risk of getting BV. Possible causes of good bacteria levels falling and bad bacteria overgrowing include:

- antibiotics;
- douching; and
- having sex;
- smoking.

Some women may simply have lower levels of good bacteria to begin with, making it easier for them to get BV.

What are the symptoms of BV?
The most common symptoms of BV are an unpleasant fishy odor in the vaginal area and a thin white or yellow vaginal discharge. Some women experience itching, pain, or a burning sensation in or around the vagina, and, less often, pelvic cramps. Sometimes BV has no symptoms at all, and is found during a routine visit to a healthcare provider (HCP). Because symptoms can vary from woman to woman, you should talk to your HCP if you think you may have BV.

How is BV diagnosed?
Bacterial vaginosis can be diagnosed only by an HCP who examines you. Most likely, your HCP will ask questions about your symptoms and do a pelvic exam to look for signs of BV. Your HCP may take a sample of the vaginal discharge to run tests in the office and/or send the sample to a lab to make the diagnosis of BV. The classic diagnosis for BV is based on having at least three of these four clinical findings:

- A thin white or yellow discharge that has a bad odor (in many cases);
- A fishy odor when potassium hydroxide is added to a sample of vaginal secretions;
- Vaginal secretions with a high pH level (more basic than acidic); and
- The presence of clue cells, which are cells from the surface of the vagina that look fuzzy and grainy under a microscope because they are covered with small bacteria.

How is BV treated?
This infection is treated with antibiotics that you take by mouth (pill, granules) or insert into your vagina (gel, cream, suppository) with an applicator. Antibiotics commonly recommended for the treatment of BV include pills such as metronidazole, clindamycin, and tinidazole; granules such as secnidazole; and vaginal gels, creams, and suppositories such as metronidazole and clindamycin. As with any antibiotic, you may experience side effects such as an upset stomach. You may need to avoid drinking alcoholic beverages if you are taking certain of these antibiotics. Your HCP may advise you to avoid having sex until antibiotic treatment is complete.

Does this treatment always work?
Unfortunately, BV may come back, even if you finish your course of antibiotics. If your symptoms come back, see your HCP again. Several different treatments can be tried.

What happens if BV is not treated?
Untreated BV can increase your chance of getting:

- pelvic inflammatory disease;
- sexually transmitted infections such as gonorrhea, chlamydia, herpes, or HIV; and
- infections after vaginal surgery.

Pregnant women with untreated BV have an increased risk of having a premature baby.

Can BV be prevented?
Because experts don’t know exactly what causes BV, we also don’t know exactly how to prevent it. But if you follow these suggestions, you can lower your chance of getting BV or other vaginal infections, and you can raise your chance of keeping your vulva (external genitalia) and vagina (internal genitalia) healthy:

- Do not douche; the vagina is self-cleaning.
- Wash the outside of the vulva with warm water only.
- Avoid using soaps, feminine washes, and deodorant sprays.
- Wear cotton underwear to help the genital area “breathe.”
- Do not use panty liners every day.
- Use condoms when you have sex with a male partner.
- Try oral probiotics containing Lactobacillus rhamnosus GR. This treatment may reduce the risk of getting recurrent BV if you tend to get these infections.

Readers are invited to photocopy Patient Education pages in the journal and distribute them to their patients.

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Bacterial vaginosis (BV) is the most prevalent vaginal infection. Although BV is not classified as a sexually transmitted infection, it is considered a sexually associated infection. As such, it may be possible to reduce the chance of developing it or at least reduce the rate of recurrences. Both acute and recurrent BV can have a direct impact on a woman’s perceptions about her body and her sexual health, which can then have an adverse effect on her sexual activities and quality of life. What can healthcare providers do to help?

**Bacterial vaginosis (BV)** is a polymicrobial condition that occurs when the normal vaginal flora shifts to include an overabundance of anaerobic bacteria such as *Gardnerella vaginalis*, *Escherichia coli*, and *Atopobium vaginae*. Common symptoms of BV, the most prevalent symptomatic vaginal condition, include vaginal odor and discharge; less common are vulvovaginal itching and burning. Although these symptoms are more annoying than directly harmful, BV can be associated with serious co-morbidities such as sexually transmitted infections (STIs), pelvic inflammatory disease (PID), pregnancy loss, preterm birth, and postpartum and post-abortion endometritis.

**BV, sexual activity, and STIs**

Overall BV prevalence in the United States is 29% among women aged 14-49 years, making it the most common vaginal infection in this age group. BV prevalence in women who have sex with women (WSW) is 25%-50%. The higher rates of BV reported in WSW are associated with receptive oral sex, a higher lifetime number of female partners, failure to clean previously used insertive sex toys before use, and anilingus with a female partner.

Compared with women who do not have BV, those with BV are more likely to have co-existing herpes simplex virus infection, trichomoniasis, and PID (Figure 1). Women with BV but no co-existing infections, when compared with women without BV, are more likely to contract trichomoniasis, chlamydia, gonorrhea, and human papillomavirus infection (Figure 2). In addition, women with BV are more susceptible to contracting HIV infection, and HIV-positive women have a higher incidence of BV. Furthermore, women with BV/HIV have an increased risk for female-to-male HIV-1 transmission and those with BV-associated bacterium 1, 2, or 3 and HIV have an increased viral shedding of HIV-1.

**BV and sexual health quality of life**

Bacterial vaginosis can have a major adverse impact on women’s quality of life (QOL), including their sexual health QOL. Almost all women with BV report feeling self-conscious, embarrassed, and uncomfortable in social situations because of their symptoms. In a survey of 304 women, nearly 80% of respondents reported avoiding sexual activity because of BV symptoms. Many women with BV attribute their symptoms to sexual activity. In addition, women with BV reported avoidance of working out, going on first dates, performing everyday activities, and spending time with family and friends.

**The healthcare provider role in prevention, treatment, and patient education**

Some women excessively cleanse their vulvovaginal area in the mistaken belief that BV is related to poor hygiene.
and that cleansing themselves in this way can help prevent the condition. Women need to understand that the healthy vagina self-maintains a balanced ecosystem, including the presence of lactobacilli species, and that excessive cleansing is unnecessary. In fact, they should wash the vulva with warm water only. Many over-the-counter (OTC) products marketed for feminine health may actually increase a woman’s risk for developing BV by causing a shift in the normal vaginal pH and disrupting the growth of protective lactobacilli species.

In a similar fashion, many women who have BV initially self-treat their symptoms with OTC products, which can pose multiple problems. Healthcare providers (HCPs) need to counsel women with a history of BV or active BV about avoiding exposure to vulvovaginal irritants such as glycerin, parabens, bleached and chlorinated feminine products, perfumes, dyes, douches, and harsh soaps. HCPs should discourage this practice and encourage women with BV symptoms to seek care from an HCP who can correctly identify the cause of the symptoms and prescribe an appropriate treatment. For women in whom BV is diagnosed, HCPs should choose an appropriate and effective treatment option that is realistic for each woman to promote compliance with the regimen and avoid BV recurrence.

Published data remain inconsistent on the impact of semen on the vaginal ecosystem, although some evidence suggests an association between semen exposure and BV. For women with a history of BV or ongoing BV who want to remain sexually active, HCPs should advise them to practice consistent condom usage with their partners and to be sure to wash sexual aids and toys before and after each use. Evidence also suggests avoidance of anilingus may reduce the incidence of BV.

Conclusion

Bacterial vaginosis is more than just a nuisance condition. Women are at an increased risk for acquiring STIs, more likely to transmit HIV, and have a higher potential for pregnancy loss and preterm birth. Women with BV can experience substantial diminution of their self-esteem and a decline in their sexual health QOL as a result of the condition, especially if they have recurrent BV. HCPs must educate women about how to reduce their chance of developing BV, recognize the symptoms of BV, follow the treatment regimen prescribed for them, and understand best practices to prevent BV recurrences.

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