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Bacterial Vaginosis

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Overview

Practice Essentials

Bacterial vaginosis (BV), or nonspecific vaginitis, was named because bacteria are the etiologic agents and an associated inflammatory response is lacking. Many studies have demonstrated the relation of Gardnerella vaginalis with other bacteria in causing BV, such as Lactobacillus, Prevotella, and anaerobes, including Mobiluncus, Bacteroides, Peptostreptococcus, Fusobacterium, Veillonella, and Eubacterium. Mycoplasma hominis, Ureaplasma urealyticum,Streptococcus viridans, and Atopobium vaginae have also been associated with BV.[1]

Signs and symptoms

Typical symptoms of BV include the following:

- Vaginal odor (the most common, and often initial, symptom of BV); often recognized only after sexual intercourse
- Mildly to moderately increased vaginal discharge
- Vulvar irritation (less common)
- Dysuria or dyspareunia (rare)

Risk factors that may predispose patients to BV include the following:

- Recent antibiotic use
- Decreased estrogen production of the host
- Wearing an intrauterine device (IUD)
- Douching
- Sexual activity that could lead to transmission (eg, having a new sexual partner or a recent increase in the number of sexual partners)

Physical findings in BV may include the following:

- Gray, thin, and homogeneous vaginal discharge, which adheres to the vaginal mucosa
- Increased light reflex of the vaginal walls, but typically with little or no evidence of inflammation
- Normal-appearing labia, introitus, cervix, and cervical discharge
- In some case, evidence of cervicitis

See Clinical Presentation for more detail.

Diagnosis

In addition to the history and vaginal examination, microscopic examination is vital to the clinical diagnosis of BV.

On microscopic examination of the discharge, demonstration of 3 of the following 4 Amsel criteria is considered necessary to diagnose BV most accurately[2] :

- Demonstration of clue cells on a saline smear (the most specific diagnostic criterion)

- A pH greater than 4.5 (up to 90% of patients)
- Characteristic thin, gray, and homogeneous discharge
- Positive whiff test (up to 70% of patients)

Nugent's criteria may be used to quantify or grade bacteria via Gram staining of vaginal samples. These criteria evaluate the following 3 types of bacteria and assign scores to each as shown:

- Lactobacillus (score, 0-4)
- Bacteroides/Gardnerella (score, 0-4)
- Mobiluncus (score, 0-2)

Total scores are calculated and interpreted as follows:

- 0-3: Normal
- 4-6: Intermediate bacterial count
- 7-10: BV

See Workup for more detail.

Management

General principles of treatment of BV include the following:

- Antibiotics are the mainstay of therapy
- Data on the efficacy of dietary supplementation with Lactobacillus (acidophilus) are conflicting
- Asymptomatic women with G vaginalis colonization do not need treatment
- BV occurring in pregnant women should be treated
- Treatment before cesarean delivery, total abdominal hysterectomy, or insertion of an IUD is also recommended
- Uncomplicated cases typically resolve after standard antibiotic treatment
- BV that does not resolve after one course of treatment may be cured by giving a second course of the same agent or by switching to another agent (eg, from metronidazole to clindamycin or from clindamycin to metronidazole)
- Some women with recurrent BV may benefit from evaluation or treatment of G vaginalis colonization in their sexual partner (controversial)
- Patients should be advised to stop douching or using bubble bath or any other over-the-counter vaginal hygiene products
- Patients should wash only with hypoallergenic bar soaps or no soap at all and should avoid liquid soaps and body washes
- Surgery is not indicated
- Testing for other infections (eg, N gonorrhoeae, C trachomatis, or herpes simplex virus [HSV]-1) may be appropriate
- Therapy with metronidazole or clindamycin may alter the vaginal flora and predispose the patient to development of vaginal candidiasis

See Treatment and Medication for more detail.

Background

Gardnerella vaginalis is a facultatively anaerobic gram-variable rod. It has been demonstrated to cause a wide variety of infections; however, it is most commonly recognized for its role as one of the organisms responsible for bacterial vaginosis (BV).[3]

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Pathophysiology

Bacterial vaginosis (BV), formerly known as nonspecific vaginitis, was named because bacteria are the etiologic agent in this infection and an associated inflammatory response is lacking.

BV is the most common cause of vaginitis and the most common infection encountered in the outpatient gynecologic setting. An increase in vaginal discharge and vaginal malodor caused by a change in the vaginal flora characterizes BV. The vaginal discharge of BV is characteristically described as a thin, gray, homogeneous fluid that is adherent to the vaginal mucosa.

Many studies have demonstrated the relationship of Gardnerella vaginalis with other bacteria in causing BV. BV is known to be a synergistic polymicrobic infection. Some of the associated bacteria include Lactobacillus species, Prevotella, and anaerobes, including Mobiluncus, Bacteroides, Peptostreptococcus, Fusobacterium, Veillonella, and Eubacterium species. Mycoplasma hominis, Ureaplasma urealyticum, and Streptococcus viridans may also play a role in BV. Atopobium vaginae is now recognized as a pathogen associated with BV.[4]

Evidence in support of a synergistic relationship includes the following: (1) Gardner and Dukes inoculated pure cultures of G vaginalis into the vaginas of healthy women and failed to produce BV symptoms; (2) inoculation of vaginal discharge fluid from BV patients into the vaginas of healthy women produced symptoms of BV; (3) treatment for BV, an antianaerobic antibiotic (metronidazole), is ineffective against G vaginalis; and (4) the volatile products elaborated from the whiff test are products of anaerobes and not of G vaginalis.

In BV, the vaginal flora becomes altered through known and unknown mechanisms, causing an increase in the local pH. This may result from a reduction in the hydrogen peroxide–producing lactobacilli. Lactobacilli are large rod-shaped organisms that help maintain the acidic pH of healthy vaginas and inhibit other anaerobic microorganisms through elaboration of hydrogen peroxide. Normally, lactobacilli are found in high concentrations in the healthy vagina. In BV, the lactobacilli population is reduced greatly, while populations of various anaerobes and G vaginalis are increased.

G vaginalis forms a biofilm in the vagina.[5] Some studies show that this biofilm may be resistant to some forms of medical treatment. This predominant G vaginalis biofilm has been shown to survive in hydrogen peroxide (H2 O2), lactic acid, and high levels of antibiotics. When the biofilm was subjected in the laboratory to enzymatic dissolution, susceptibility to H2 O2 and lactic acid were restored.[5] These findings may lead to future development of novel therapies involving enzymatic degradation of biofilms. No such products are currently on the market.

In a study published by Fredricks et al, G vaginalis was detected by PCR in 96% of subjects with BV and 70% of those without BV. Multiple other bacterial species were found by PCR in this study. Fredricks' study confirms the polymicrobial nature of BV and the presence of G vaginalis as one of the causative agents.[6]

Although BV is not considered a sexually transmitted disease, sexual activity has been linked to development of this infection. Observations in support of this include the following: (1) incidence of BV increases with an increase in the number of recent and lifetime sexual partners, (2) a new sexual partner can be related to BV, and (3) male partners of women with BV may have urethral colonization by the same organism, but the male is asymptomatic. Evidence that does not support an exclusive sexually transmitted role of BV is its occurrence in virginal females and its colonization of the rectum in virginal boys and girls.

More recent studies indicated that BV is associated with changes in select soluble immune mediators, an increase in HIV target cells, and a reduction in endogenous antimicrobial activity, which may contribute to the increased risk of HIV acquisition.[7, 8]

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Etiology

Bacterial vaginosis is a polymicrobic synergistic infection. As described in Pathophysiology, the normally predominant lactobacilli population is reduced in the vagina, while populations of Gardnerella vaginalis and other anaerobes are increased.

G vaginalis is the only member of its genus. Originally, it was known as Haemophilus vaginalis and then as Corynebacterium vaginale. It is a nonmotile, nonflagellated, nonsporeforming, facultative anaerobic, and nonencapsulated bacteria.

Although G vaginalis appears microscopically as a gram-variable rod, it is officially categorized as a gram-negative rod.

Other factors associated in the development of BV include douching, tub bathing (particularly with bubble bath), use of over-the-counter intravaginal hygiene products, multiple sexual partners, high frequency of intercourse, the use of an IUD and the presence of other sexually transmitted diseases.[9] The theory for why these factors contribute to the development of BV is that they disrupt the normal vaginal flora. Some evidence shows that hormonal contraception (both combined estrogen/progestin and progestin only) is protective for the development of BV. Recurrent BV may be attributable to previous colonization of the oral cavity or anus with BV-associated bacteria.[10]

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Epidemiology

United States statistics

BV occurs in one third of adult women in the United States, which represents approximately 21 million women. Each year, women make 10 million office visits for vaginal discharge.[11] An increased prevalence is associated with cigarette smoking, obesity, being single/never married, prior pregnancy, and a history of induced abortion.[9]

Gardnerella vaginalis has been reported to occur in up to 100% of women with signs and symptoms of BV and in up to 70% of women with no signs or symptoms of BV.

G vaginalis has been isolated in up to 80% of the urethras of male sexual partners of women with BV. However, treatment of male partners is not recommended as it has not been shown to alter rates of BV in their female partners.

The incidence of BV in patients attending obstetric clinics is 10-25% and may be as high as 30-65% in patients attending sexually transmitted disease clinics.

Race-, sex-, and age-related demographics

Some studies have shown that bacterial vaginosis appears to occur more commonly among African American women than non-Hispanic white women.[9] The reasons for this are not entirely clear.

G vaginalis colonization and/or infection predominantly occurs in women. Men rarely develop infections with G vaginalis; however, the urethras of men whose sexual partners have symptoms of BV are frequently colonized with the same strain of G vaginalis. A recent study by Bradshaw et al found that G vaginalis is not associated with nongonococcal urethritis.

G vaginalis infections typically occur in women of reproductive age. Studies have documented G vaginalis colonization in prepubertal and/or virginal girls and boys and cases of BV occurring in prepubertal and/or virginal girls.

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Prognosis

Uncomplicated cases of bacterial vaginosis (BV) typically resolve after the standard antibiotic treatment.

Mortality/Morbidity

The prognosis for uncomplicated cases of bacterial vaginosis is generally excellent. Uncomplicated bacterial vaginosis that is assessed promptly typically resolves with standard antibiotic treatment.

The prognosis for complicated cases of bacterial vaginosis leading to other infections varies depending on the particular infectious process. Note the following:

- Long-standing or untreated BV may lead to more serious sequelae, such as endometritis, salpingitis, pelvic inflammatory disease, or complications of pregnancy, including premature rupture of membranes, premature labor, chorioamnionitis, and postpartum endometritis.
- BV leads to an increased risk for acquiring HIV,[6, 12, 13] and intravaginal practices are an important risk factor for developing BV.[12]
- Postgynecologic procedure infections, such as vaginal cuff cellulitis (status posthysterectomy) and postabortion infection may also occur.
- Suspect concomitant infections (such as candida vaginitis) or newer, resistant organisms (Atopobium vaginae) in patients whose symptoms do not resolve after treatment of BV. See Treatment.

Complications

Bacterial vaginosis (BV) may lead to an increased risk of salpingitis and/or endometritis, postsurgical infections (eg, postcesarean endometritis, posthysterectomy vaginal cuff cellulitis), and adverse outcomes in pregnancy, including premature rupture of membranes, premature labor, chorioamnionitis, and postpartum endometritis.

Mixed infections

Mixed infections with Trichomonas and yeast can occur among patients with BV.

Bacteremia

Gardnerella vaginalis bacteremia occurs much more commonly in women than in men and occurs most commonly in postpartum and postgynecologic procedure infections (eg, postpartum endometritis, chorioamnionitis, septic abortion) but is rare.

SPS, the anticoagulant used in blood culture media, is toxic to G vaginalis and inhibits its growth unless a neutralizing gelatin is added to counteract this effect. Routine blood cultures, therefore, may not grow G vaginalis, leading to underdiagnosis and underrecognition of this organism as the etiologic agent in these types of infections.

Genitourinary infections

Although G vaginalis urinary tract infections (UTI) occur much more frequently in women than in men, the overall occurrence of G vaginalis as a causative etiology in this infection is low (< 0.6%). However, the overall frequency may be underestimated because of a lack of optimal laboratory growth conditions (eg, aerobic incubation, short anaerobic growth period, urine not properly refrigerated prior to being cultured) and absence of associated pyuria occurring in women with concomitantly positive urine cultures.

In men, infections caused by G vaginalis are uncommon. Infection of the prostate and urinary bladder have been documented, although this occurs rarely and probably arises as a result of ascending spread of the organism from the colonized urethra. Balanoposthitis from G vaginalis has also been described.

Other complications

Other infections caused by G vaginalis include chorioamnionitis, endometritis, cervicitis, pelvic inflammatory disease, vaginal cuff cellulitis following hysterectomy, and bacteremia.

Case reports include disc space infection (lumbar spine), vaginitis emphysematosa, liver abscess (postcesarean), neonatal meningitis, and neonatal cellulitis/skin abscess.

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Patient Education

Educate patients regarding the basic pathophysiology, natural history, and risk factors of the bacterial vaginosis. BV is not considered a sexually transmitted disease, although sexual contact may predispose patients to development of this process in some cases.

For patient education resources, see Women's Health Center and Pregnancy Center, as well as Sexually Transmitted Diseases (STDs), Trichomoniasis, Birth Control Overview, and Birth Control Methods.

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Presentation

History

Symptoms of bacterial vaginosis include the following:

- Vaginal odor is the most common, and often initial, symptom of bacterial vaginosis (BV). Odor may be recognized only after sexual intercourse. The alkalinity of semen may cause a release of volatile amines from the vaginal discharge and cause a fishy odor.
- Increased vaginal discharge is typically mild to moderate.
- Vulvar irritation is less common.

- Dysuria or dyspareunia occur rarely.

Inquire about risk factors that may predispose patients to developing BV. Predisposing factors can include the following:

- Recent antibiotic use
- Decreased estrogen production of the host
- Wearing an intrauterine device (IUD)
- Douching
- Sexual activity that could lead to transmission, as evidenced by the patient having a new sexual partner, an increased number of sexual partners in the month preceding the onset of BV symptoms, or having an increased number of lifetime sexual partners

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Physical

Vaginal discharge features include the following:

- Most often gray, thin, and homogeneous
- Adherent to the vaginal mucosa
- May not visualize pooling of discharge in the posterior fornix because of adherence to the vaginal mucosa
- May observe small bubbles in the discharge fluid

An increased light reflex of the vaginal walls may be observed, indicating a very wet appearance; however, typically, no or little evidence of inflammation is apparent.

The labia, introitus, cervix, and cervical discharge appear normal.

Evidence of cervicitis should prompt a workup for concomitant infection with Neisseria gonorrhoeae, Chlamydia trachomatis, or herpes simplex virus (HSV).

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Diagnostic Considerations

Important considerations

For patients presenting with atypical clinical features of bacterial vaginosis, the clinician must be aware of the possibility of a coinfection, such as vaginal candidiasis, trichomoniasis, infection with C trachomatis or N gonorrhoeae, HSV infection, or an alternative diagnosis.

Provide patients at risk of HIV with HIV counseling and testing.

Special concerns

No adequate and well-controlled human trials evaluating teratogenicity of clindamycin or metronidazole in pregnant women have been performed.

The use of the cream formulation of clindamycin may result in preterm birth.

Several clinical trials using both preparations in pregnancy have been conducted. The use of metronidazole after the first trimester is considered within the standard of care.

Differential Diagnoses

- Candidiasis

- Cervicitis
- Chlamydia (Chlamydial Genitourinary Infections)
- Gonorrhea
- Herpes Simplex
- Trichomoniasis
- Vaginal Candidiasis
- Vaginitis

Workup

Laboratory Studies

Clinical diagnosis of bacterial vaginosis (BV) relies on history, vaginal examination, and microscopic examination (see the Table under "Diagnostic tools" for a summary of the differential diagnoses). Emerging data support sending vaginal cultures in recalcitrant cases.[14]

Obtain historical information regarding the patient's symptoms and nature of the discharge. Patients may report the following:

- Most patients experience a vaginal malodor and/or an increase in vaginal discharge.
- Vulvar irritation may be present or absent.
- Dysuria, dyspareunia, and abdominal pain are lacking.

Vaginal examination

Findings on vaginal examination include the following:

- Typical BV discharge characteristics
- Lack of significant vulvovaginal inflammation

Microscopic examination of the discharge

Demonstrating three of the following four Amsel's criteria is considered necessary to diagnose BV most accurately[2] :

- Demonstration of clue cells on a saline smear is the most specific criterion for diagnosing BV. Clue cells are vaginal epithelial cells that have bacteria adherent to their surfaces. The edges of the squamous epithelial cells, which normally have a sharply defined cell border, become studded with bacteria. The epithelial cells appear to be peppered with coccobacilli.
- A pH greater than 4.5 indicates infection, and pH may be elevated in up to 90% of patients with BV.
- Characteristic discharge appearance is thin, gray, and homogeneous.
- The whiff test may be positive in up to 70% of BV patients. This test is performed by placing a drop of 10% KOH on the speculum after the vaginal examination or mixing vaginal fluid with a drop of KOH on a microscope slide. The KOH, by virtue of its alkaline properties, causes the release of volatile amines from the vaginal fluid. The amines are products of anaerobic bacterial metabolism.

The vaginal discharge of patients with BV is notable for its lack of polymorphonuclear leukocytes (PMNs), typically 1 or less than 1 PMN per vaginal epithelial cell.

Diagnosing BV accurately is more difficult when a coinfection is present. However, finding an increase in the number of PMNs per epithelial cell may lead the clinician to consider BV as a possibility.

Microscopic evaluation of the bacteria flora

The bacterial flora may be examined microscopically for evidence of changes in the overall bacterial predominance. The healthy vagina has a predominance of lactobacilli (large gram-positive rods). The flora of a patient with BV changes to become dominated by coccobacilli, reflecting an increase in the growth of Gardnerella vaginalis and other anaerobes.

Many use Nugent's criteria to quantify or grade bacteria via Gram stain of vaginal samples. In brief, Nugent's criteria evaluate 3 types of bacteria via Gram stain: Lactobacillus, Bacteroides/Gardnerella, and Mobiluncus. They are each graded on a scale of 1-4 (1+ is < 1 cell per field, 2+ is 1-5 cells per field, 3+ is 6-30 cells per field, and 4+ is >30 cells per field). In this system, Lactobacillus and Bacteroides/Gardnerella are given scores between 0-4 but Mobiluncus is only graded from 0-2. Total scores are then calculated and used as follows: 0-3 (Normal), 4-6 (intermediate bacterial count), and 7-10 (bacterial vaginosis).[15]

Vaginal cultures

Obtaining routine vaginal cultures in patients with BV has no utility, because this is a polymicrobial infection and some women may have asymptomatic carriage of G vaginalis organisms. Although G vaginalis has been demonstrated to grow in up to 100% of vaginal cultures of women with BV, it has also been cultured in up to 70% of asymptomatic women. However, obtaining cultures to exclude other infectious etiologies (eg, Trichomonas species, C trachomatis, N gonorrhoeae) is appropriate. In recurrent cases that have not resolved with standard regimens, cultures may be appropriate.

Diagnostic tools

FemExam[16] has been shown to have variable sensitivity (38-90%) and specificity (12.5-97%) depending on the study and study population (pre- vs postmenopausal).[17] The test provides a result in 2 minutes.

Other diagnostic tools use DNA extracted from samples of vaginal fluid using Instagene Matrix (Bio-Rad Laboratories, Hercules, CA). Results of these tests often show a difference in the bacterial components in women with BV who are postmenopausal compared with those who are premenopausal. This information is certainly helpful, particularly in treatment failures to better tailor antibiotic treatment.[17]

Table. Differential Diagnosis of the Vaginitides (Open Table in a new window)

Clinical Elements		Bacterial Vaginosis	Trichomoniasis	Vaginal Candidiasis
Symptoms	Vaginal odor	+	+/-	-
	Vaginal discharge	Thin, gray, homogenous	Green-yellow	White, curdlike
	Vulvar irritation	+/-	+	+
	Dyspareunia	-	+	-
Signs	Vulvar erythema	-	+/-	+/-
	Bubbles in vaginal fluid	+	+/-	-
	Strawberry cervix	-	+/-	-
Microscopy	Saline wet mount			

Clue cells	+	-	-
Motile protozoa	-	+	-
KOH test			
Pseudohyphae	-	-	+
Whiff test	+	+/-	-
pH	>4.5	>4.5	< 4.5

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Other Tests

Recent research indicates that genital cytokine profiles may be used as a biomarker of sexually transmitted infections (STIs) and BV to identify women with asymptomatic, treatable infections, which may allow improvement in treatment of these conditions and possibly reduce the risk of HIV infection in high-risk women.[18] Masson et al found that that evaluating clinical signs/symptoms in conjunction with evaluation of IL-1beta and IP-10 as biomarkers of genital inflammation is more sensitive and specific than clinical signs/symptoms alone (increased IL-1beta and decreased IP-10 concentrations).[18]

Although metronidazole is a first-line agent for treatment of BV, it is not unusual for treatment failure and recurrent disease to occur.[3] Of the four clades in the population structure of G vaginalis clades 1 and 3 are associated with BV. Schyuler et al found that metronidazole resistance was highly associated with clade 3 ($P < 0.0001$) compared to clade 1, which may have treatment implications.[3]

Abramovici et al suggest that quantitative polymerase chain reaction (qPCR) bacterial load measurement is useful in the evaluation of BV treatment response and the risk of preterm birth in pregnant women.[19] The investigators found that qPCR correlated with Nugent score and demonstrated decreased bacterial load after antibiotic treatment.

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Treatment

Approach Considerations

Inpatient care is not necessary for patients with bacterial vaginosis.

Obtain cultures of blood and infected tissue (if feasible) from inpatients who develop obstetric/gynecologic postoperative fever or signs of infection to try to elucidate the infectious etiologic organism. Blood cultures may not demonstrate growth of Gardnerella vaginalis unless gelatin is added to the media to prevent inhibition from the anticoagulant, sodium polyethanol sulfonate (SPS).

Surgery is not indicated for bacterial vaginosis.

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Medical Care

Note the following:

- Antibiotics are the mainstay of therapy for bacterial vaginosis (BV), but asymptomatic women with Gardnerella vaginalis colonization do not need treatment.
- Studies of topically applied and orally administered yogurt/lactobacilli preparations, which are used to help reestablish the lactobacilli population in the vagina, have demonstrated inconsistent results.
- Some women with recurrent cases of BV may benefit from evaluation and/or treatment of G vaginalis colonization in their sexual partner. This approach is controversial.
- Treat BV occurring in pregnant women to reduce the risk of pregnancy-associated complications related to infection. Although not tested by clinical trials, treatment prior to cesarean delivery, total abdominal hysterectomy, and insertion of an IUD is also recommended.
- Advise patients to stop douching or using bubble bath or any other over-the-counter vaginal hygiene products.
- Wash only with hypoallergenic bar soaps or no soap at all. Avoid liquid soaps and body washes.

Consultations

Consultation with an infectious disease specialist or obstetrician/gynecologist may be warranted for patients with nonresolving and/or recurring BV or more serious infections, such as endometritis, pelvic inflammatory disease, and chorioamnionitis.

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Diet and Activity

Studies are conflicting regarding the efficacy of a diet supplemented with Lactobacillus (acidophilus).

Ya et al conducted a placebo-controlled trial to assess the effectiveness of a vaginal probiotic product (8 billion units of Lactobacillus rhamnosus, L acidophilus, and Streptococcus thermophilus per capsule) for recurrent bacterial vaginosis prevention. The dosage regimen consisted of short-term use of 7 days on, 7 days off, then 7 days on. Probiotic prophylaxis resulted in lower recurrence rates for bacterial vaginosis and Gardnerella vaginalis for 2 months. A lower incidence was also reported during follow-up (2-11 months) in women in the probiotic group.[20]

Restriction of activities is not necessary for patients with bacterial vaginosis. Other, more serious Gardnerella infections may require restriction of activity based on the severity and nature of the illness.

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Medication

Medication Summary

Antibiotics are the mainstay of therapy for bacterial vaginosis. Medications include metronidazole (Flagyl), clindamycin (Cleocin) oral or vaginal suppositories, and metronidazole vaginal gel (MetroGel-Vaginal). Metronidazole and clindamycin are the preferred medications used to treat Gardnerella infections. See Medication for specific information on these medications.

In September 2017, the FDA approved the first single-dose oral treatment secnidazole (Solosec, Symbiomix Therapeutics) for women with bacterial vaginosis.[21] Approval was based on two randomized, placebo-controlled studies which evaluated the efficacy of secnidazole in treatment of bacterial vaginosis. Efficacy was assessed by clinical outcomes evaluated 21-30 days following a single dose of secnidazole. A clinical responder was defined as having "normal" vaginal discharge, negative "whiff" test, and clue cells < 20%; additional endpoints included Nugent score cure and therapeutic outcome.

In both trials, a statistically significantly greater percentage of patients experienced clinical response (Trial 1: 67.7%; Trial 2: 53.3%), Nugent score cure (Trial 1: 40.3%; Trial 2: 43.9%), and therapeutic response (Trial 1: 40.3%; Trial 2: 34.6%) at 21-30 days following a single dose of Solosec compared to placebo.[22, 23]

A double-blind, randomized controlled trial by Subtil et al that included 5630 pregnant women with bacterial vaginosis reported that systematic screening and subsequent treatment for bacterial vaginosis in women with low-risk pregnancies showed no evidence of risk reduction of late miscarriage or spontaneous very preterm birth.[27]

Antibiotics

Class Summary

Therapy must be comprehensive and cover all likely pathogens in the context of this clinical setting.

Clindamycin (Cleocin)

Bacteriostatic antibiotic used against gram-positive aerobes and gram-positive and gram-negative anaerobes. Inhibits bacterial growth, possibly by blocking dissociation of peptidyl tRNA from ribosomes, causing RNA-dependent protein synthesis to arrest. Available as capsule and 2% vaginal cream formulation.

Metronidazole (Flagyl)

Bactericidal antibiotic enters bacterial cell and is reduced by electron transport proteins. Free radicals are formed, which react with intracellular components and/or DNA and result in subsequent cell death. Antimicrobial spectrum includes many gram-positive and gram-negative anaerobes and protozoal parasites.

Metronidazole (MetroGel-Vaginal)

Bactericidal antibiotic enters the bacterial cell and is reduced by electron transport proteins. Free radicals are formed, which react with intracellular components and/or DNA and result in subsequent cell death. Antimicrobial spectrum includes many gram-positive and gram-negative anaerobes and protozoal parasites.

Secnidazole (Solosec)

Secnidazole is a nitroimidazole derivative; 5-nitroimidazoles enters the bacterial cell as an inactive prodrug where the nitro group is reduced by bacterial enzymes to radical anions; it is believed that these radical anions interfere with bacterial DNA synthesis of susceptible isolates.

Follow-up

Further Outpatient Care

Uncomplicated cases of bacterial vaginosis (BV) typically resolve after the standard antibiotic treatment.

BV that does not resolve after one course of treatment may be cured by a second course with the same agent. Another option is to switch to another agent (ie, metronidazole to clindamycin, or clindamycin to metronidazole) as other concomitant organisms may respond better to an alternate medication. Metronidazole is favored because it allows faster return of colonization of H2 O2 -producing lactobacilli.[24]

Some women with recurrent episodes of BV may benefit from treatment of Gardnerella vaginalis in their sexual partner if colonization is demonstrated, although this is controversial and not usually supported by the data. A Cochrane review found that antibiotic treatment for sexual partners of women with bacterial vaginosis had no effect on the rate of improvement in the women.[25] Repeating wet preps is useful because patients can develop new, non-BV infections such as Candida. Using other diagnostic modalities may prove helpful, such as the DNA tests that may allow for more specific delineation of bacterial species, which will allow for more specific antibiotic treatment. A temporary use of condoms with their partner may help prevent recurrent infections.

Testing for other infections, such as N gonorrhoeae, C trachomatis, and herpes simplex virus type 1 (HSV-1) may be appropriate in individuals with BV because the incidence of sexually transmitted diseases (STDs) may be increased in this

population depending upon the risk factors and demographics.

Therapy with metronidazole or clindamycin may alter the vaginal flora and predispose the patient to development of vaginal candidiasis.

Discourage douching, bubble baths, and over-the-counter vulvovaginal hygiene products.

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Deterrence/Prevention

Predisposing factors that may contribute to development of bacterial vaginosis (BV) are listed below. Correction or modification of the following factors may help reduce the incidence or recurrence of BV:

- Recent antibiotic use
- Decreased estrogen production of the host
- Wearing an IUD
- Douching
- Bubble baths
- Feminine hygiene products (sprays and other vulvovaginal products marketed for feminine cleanliness)
- Liquid soaps and body washes (hypoallergenic bar soaps are superior)
- Sexual activity leading to transmission, as evidenced by the patient having a new sexual partner, an increased number of sexual partners in the month preceding the onset of BV symptoms, and an increased number of lifetime sexual partners

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Questions & Answers

Overview

What is the mainstay of therapy for bacterial vaginosis (BV)?

What is the role of secnidazole in the treatment of bacterial vaginosis (BV)?

Which medications in the drug class Antibiotics are used in the treatment of Bacterial Vaginosis?

Follow-up

What further care for bacterial vaginosis (BV) is needed following treatment?

What is the treatment for recurrent episodes of bacterial vaginosis (BV)?

Which tests may be performed following treatment of bacterial vaginosis (BV)?

What causes candidiasis following treatment of bacterial vaginosis (BV)?

What should be discouraged in patients with bacterial vaginosis (BV)?

What predisposing factors may contribute to the development of bacterial vaginosis (BV)?

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