

874 staining of vaginal fluid can be used to score alterations in the vaginal microbiota but is used primarily for research purposes and requires familiarity with the morphotypes and scale involved.

TREATMENT VAGINAL DISCHARGE

Patterns of treatment for vaginal discharge vary widely. In developing countries, where clinics or pharmacies often dispense treatment based on symptoms alone without examination or testing, oral treatment with metronidazole—particularly with a 7-day regimen—provides reasonable coverage against both trichomoniasis and bacterial vaginosis, the usual causes of symptoms of vaginal discharge. Metronidazole treatment of sex partners prevents reinfection of women with trichomoniasis, even though it does not help prevent the recurrence of bacterial vaginosis. Guidelines for syndromic management promulgated by the World Health Organization suggest consideration of treatment for cervical infection and for trichomoniasis, bacterial vaginosis, and vulvovaginal candidiasis in women with symptoms of abnormal vaginal discharge. However, it is important to note that the majority of chlamydial and gonococcal cervical infections produce no symptoms.

In industrialized countries, clinicians treating symptoms and signs of abnormal vaginal discharge should, at a minimum, differentiate between bacterial vaginosis and trichomoniasis, because optimal management of patients and partners differs for these two conditions (as discussed briefly below).

Vaginal Trichomoniasis (See also Chap. 254) Symptomatic trichomoniasis characteristically produces a profuse, yellow, purulent, homogeneous vaginal discharge and vulvar irritation, sometimes with visible inflammation of the vaginal and vulvar epithelium and petechial lesions on the cervix (the so-called strawberry cervix, usually evident only by colposcopy). The pH of vaginal fluid—normally <4.7—usually rises to ≥ 5 . In women with typical symptoms and signs of trichomoniasis, microscopic examination of vaginal discharge mixed with saline reveals motile trichomonads in most culture-positive cases. However, saline microscopy probably detects only one-half of all cases, and, especially in the absence of symptoms or signs, culture or NAAT is usually required for detection of the organism. NAAT for *T. vaginalis* is as sensitive as or more sensitive than culture, and NAAT of urine has disclosed surprisingly high prevalences of this pathogen among men at several STD clinics in the United States. Treatment of asymptomatic as well as symptomatic cases reduces rates of transmission and prevents later development of symptoms.

TREATMENT VAGINAL TRICHOMONIASIS

Only nitroimidazoles (e.g., metronidazole and tinidazole) consistently cure trichomoniasis. A single 2-g oral dose of metronidazole is effective and much less expensive than the alternatives. Tinidazole has a longer half-life than metronidazole, causes fewer gastrointestinal symptoms, and may be useful in treating trichomoniasis that fails to respond to metronidazole. Treatment of sexual partners—facilitated by dispensing metronidazole to the female patient to give to her partner(s), with a warning about avoiding the concurrent use of alcohol—significantly reduces both the risk of reinfection and the reservoir of infection; treating the partner is the standard of care. Intravaginal treatment with 0.75% metronidazole gel is not reliable for vaginal trichomoniasis. Systemic use of metronidazole is recommended throughout pregnancy. In a large randomized trial, metronidazole treatment of trichomoniasis during pregnancy did not reduce—and in fact actually increased—the frequency of perinatal morbidity; thus routine screening of asymptomatic pregnant women for trichomoniasis is not recommended.

Bacterial Vaginosis Bacterial vaginosis (formerly termed *nonspecific vaginitis*, *Haemophilus vaginitis*, *anaerobic vaginitis*, or *Gardnerella-associated*

vaginal discharge) is a syndrome of complex etiology that is characterized by symptoms of vaginal malodor and a slightly to moderately increased white discharge, which appears homogeneous, is low in viscosity, and evenly coats the vaginal mucosa. Bacterial vaginosis has been associated with increased risk of acquiring several other genital infections, including those caused by HIV, *C. trachomatis*, and *N. gonorrhoeae*. Other risk factors include recent unprotected vaginal intercourse, having a female sex partner, and vaginal douching. Although bacteria associated with bacterial vaginosis have been detected under the foreskin of uncircumcised men, metronidazole treatment of male partners has not reduced the rate of recurrence among affected women.

Among women with bacterial vaginosis, culture of vaginal fluid has shown markedly increased prevalences and concentrations of *G. vaginalis*, *Mycoplasma hominis*, and several anaerobic bacteria (e.g., *Mobiluncus*, *Prevotella* [formerly *Bacteroides*], and some *Peptostreptococcus* species) as well as an absence of hydrogen peroxide-producing *Lactobacillus* species that constitute most of the normal vaginal microbiota and help protect against certain cervical and vaginal infections. Broad-range polymerase chain reaction (PCR) amplification of 16S rDNA in vaginal fluid, with subsequent identification of specific bacterial species by various methods, has documented an even greater and unexpected bacterial diversity, including several unique species not previously cultivated (e.g., three species in the order Clostridiales that appear to be specific for bacterial vaginosis and are associated with metronidazole treatment failure [Fig. 163-2]). Also detected are DNA sequences related to *Atopobium vaginae*, an organism that is strongly associated with bacterial vaginosis, is resistant to metronidazole, and is also associated with recurrent bacterial vaginosis after metronidazole treatment. Other genera newly implicated in bacterial vaginosis include *Megasphaera*, *Leptotrichia*, *Eggerthella*, and *Dialister*.

Bacterial vaginosis is conventionally diagnosed clinically with the Amsel criteria, which include any three of the following four clinical abnormalities: (1) objective signs of increased white homogeneous vaginal discharge; (2) a vaginal discharge pH of >4.5 ; (3) liberation of a distinct fishy odor (attributable to volatile amines such as trimethylamine) immediately after vaginal secretions are mixed with a 10% solution of KOH; and (4) microscopic demonstration of “clue cells” (vaginal epithelial cells coated with coccobacillary organisms, which have a granular appearance and indistinct borders; Fig. 163-3) on a wet mount prepared by mixing vaginal secretions with normal saline in a ratio of $\sim 1:1$.

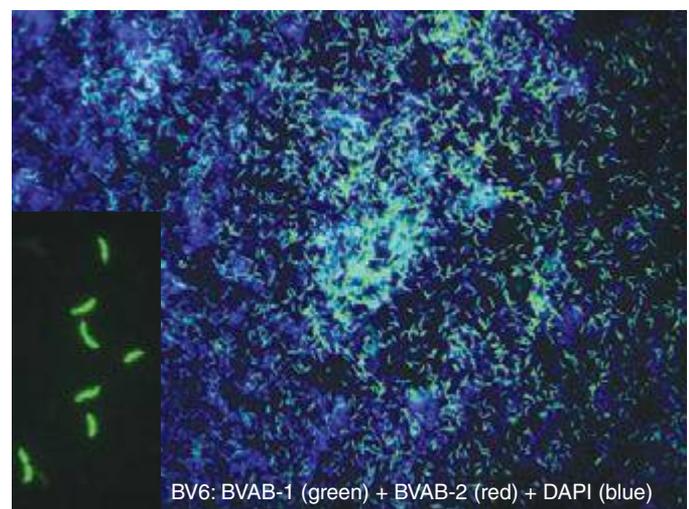


FIGURE 163-2 Broad-range polymerase chain reaction amplification of 16S rDNA in vaginal fluid from a woman with bacterial vaginosis shows a field of bacteria hybridizing with probes for bacterial vaginosis-associated bacterium 1 (BVAB-1, visible as a thin, curved green rod) and for BVAB-2 (red). The inset shows that BVAB-1 has a morphology similar to that of *Mobiluncus* (curved rod). (Reprinted with permission from DN Fredricks et al: *N Engl J Med* 353:1899, 2005.)