

Certain vulvovaginal infections may have serious sequelae. Trichomoniasis, bacterial vaginosis, and vulvovaginal candidiasis have all been associated with increased risk of acquisition of HIV infection; bacterial vaginosis may promote HIV transmission from HIV-infected women to their male sex partners. Vaginal trichomoniasis and bacterial vaginosis early in pregnancy independently predict premature onset of labor. Bacterial vaginosis can also lead to anaerobic bacterial infection of the endometrium and salpinges. Vaginitis may be an early and prominent feature of toxic shock syndrome, and recurrent or chronic vulvovaginal candidiasis develops with increased frequency among women who have systemic illnesses, such as diabetes mellitus or HIV-related immunosuppression (although only a very small proportion of women with recurrent vulvovaginal candidiasis in industrialized countries actually have a serious predisposing illness).

Thus vulvovaginal symptoms or signs warrant careful evaluation, including speculum and pelvic examination, simple rapid diagnostic tests, and appropriate therapy specific for the anatomic site and type of infection. Unfortunately, a survey in the United States indicated that clinicians seldom perform the tests required to establish the cause of such symptoms. Further, comparison of telephone and office management of vulvovaginal symptoms has documented the inaccuracy of the former, and comparison of evaluations by nurse-midwives with those by physician-practitioners showed that the practitioners'

clinical evaluations correlated poorly both with the nurses' evaluations and with diagnostic tests. The diagnosis and treatment of the three most common types of vaginal infection are summarized in **Table 163-5**.

Inspection of the vulva and perineum may reveal tender genital ulcerations or fissures (typically due to HSV infection or vulvovaginal candidiasis) or discharge visible at the introitus before insertion of a speculum (suggestive of bacterial vaginosis or trichomoniasis). Speculum examination permits the clinician to discern whether the discharge in fact looks abnormal and whether any abnormal discharge in the vagina emanates from the cervical os (mucoid and, if abnormal, yellow) or from the vagina (not mucoid, since the vaginal epithelium does not produce mucus). Symptoms or signs of abnormal vaginal discharge should prompt testing of vaginal fluid for pH, for a fishy odor when mixed with 10% KOH, and for certain microscopic features when mixed with saline (motile trichomonads and/or "clue cells") and with 10% KOH (pseudohyphae or hyphae indicative of vulvovaginal candidiasis). Additional objective laboratory tests useful for establishing the cause of abnormal vaginal discharge include rapid point-of-care tests for bacterial vaginosis and *T. vaginalis*, as described below; a DNA probe test (the Affirm test) to detect *T. vaginalis* and *C. albicans* as well as the increased concentrations of *Gardnerella vaginalis* associated with bacterial vaginosis; and a NAAT for *T. vaginalis*. Gram's

TABLE 163-5 DIAGNOSTIC FEATURES AND MANAGEMENT OF VAGINAL INFECTION

| Feature | Normal Vaginal Examination | Vulvovaginal Candidiasis | Trichomonal Vaginitis | Bacterial Vaginosis |
|--|---|---|---|--|
| Etiology | Uninfected; lactobacilli predominant | <i>Candida albicans</i> | <i>Trichomonas vaginalis</i> | Associated with <i>Gardnerella vaginalis</i> , various anaerobic and/or noncultured bacteria, and mycoplasmas |
| Typical symptoms | None | Vulvar itching and/or irritation | Profuse discharge; vulvar itching | Malodorous, slightly increased discharge |
| Discharge | | | | |
| Amount | Variable; usually scant | Scant | Often profuse | Moderate |
| Color ^a | Clear or translucent | White | White or yellow | White or gray |
| Consistency | Nonhomogeneous, flocculent | Clumped; adherent plaques | Homogeneous | Homogeneous, low viscosity; uniformly coats vaginal walls |
| Inflammation of vulvar or vaginal epithelium | None | Erythema of vaginal epithelium, introitus; vulvar dermatitis, fissures common | Erythema of vaginal and vulvar epithelium; colpitis macularis | None |
| pH of vaginal fluid ^b | Usually ≤4.5 | Usually ≤4.5 | Usually ≥5 | Usually >4.5 |
| Amine ("fishy") odor with 10% KOH | None | None | May be present | Present |
| Microscopy ^c | Normal epithelial cells; lactobacilli predominant | Leukocytes, epithelial cells; mycelia or pseudomycelia in up to 80% of <i>C. albicans</i> culture-positive persons with typical symptoms | Leukocytes; motile trichomonads seen in 80–90% of symptomatic patients, less often in the absence of symptoms | Clue cells; few leukocytes; no lactobacilli or only a few outnumbered by profuse mixed microbiota, nearly always including <i>G. vaginalis</i> plus anaerobic species on Gram's stain (Nugent's score ≥7) |
| Other laboratory findings | | Isolation of <i>Candida</i> spp. | Isolation of <i>T. vaginalis</i> or positive NAAT ^d | |
| Usual treatment | None | Azole cream, tablet, or suppository—e.g., miconazole (100-mg vaginal suppository) or clotrimazole (100-mg vaginal tablet) once daily for 7 days Fluconazole, 150 mg orally (single dose) | Metronidazole or tinidazole, 2 g orally (single dose) Metronidazole, 500 mg PO bid for 7 days | Metronidazole, 500 mg PO bid for 7 days Metronidazole gel, 0.75%, one applicator (5 g) intravaginally once daily for 5 days Clindamycin, 2% cream, one full applicator vaginally each night for 7 days |
| Usual management of sexual partner | None | None; topical treatment if candidal dermatitis of penis is detected | Examination for sexually transmitted infection; treatment with metronidazole, 2 g PO (single dose) | None |

^aColor of discharge is best determined by examination against the white background of a swab. ^bA pH determination is not useful if blood is present or if the test is performed on endocervical secretions. ^cTo detect fungal elements, vaginal fluid is digested with 10% KOH prior to microscopic examination; to examine for other features, fluid is mixed (1:1) with physiologic saline. Gram's stain is also excellent for detecting yeasts (less predictive of vulvovaginitis) and pseudomycelia or mycelia (strongly predictive of vulvovaginitis) and for distinguishing normal flora from the mixed flora seen in bacterial vaginosis, but it is less sensitive than the saline preparation for detection of *T. vaginalis*. ^dNAAT, nucleic acid amplification test (where available).