



**FIGURE 163-3** Wet mount of vaginal fluid showing typical clue cells from a woman with bacterial vaginosis. Note the obscured epithelial cell margins and the granular appearance attributable to many adherent bacteria ( $\times 400$ ). (Photograph provided by Lorna K. Rabe, reprinted with permission from S Hillier et al, in KK Holmes et al [eds]: *Sexually Transmitted Diseases*, 4th ed. New York, McGraw-Hill, 2008.)

### TREATMENT BACTERIAL VAGINOSIS

The standard dosage of oral metronidazole for the treatment of bacterial vaginosis is 500 mg twice daily for 7 days. The single 2-g oral dose of metronidazole recommended for trichomoniasis produces significantly lower short-term cure rates and should not be used. Intravaginal treatment with 2% clindamycin cream (one full applicator [5 g containing 100 mg of clindamycin phosphate] each night for 7 nights) or with 0.75% metronidazole gel (one full applicator [5 g containing 37.5 mg of metronidazole] twice daily for 5 days) is also approved for use in the United States and does not elicit systemic adverse reactions; the response to both of these treatments is similar to the response to oral metronidazole. Other alternatives include oral clindamycin (300 mg twice daily for 7 days), clindamycin ovules (100 g intravaginally once at bedtime for 3 days), and oral tinidazole (1 g daily for 5 days or 2 g daily for 3 days). Unfortunately, recurrence over the long term (i.e., several months later) is distressingly common after either oral or intravaginal treatment. A randomized trial comparing intravaginal gel containing 37.5 mg of metronidazole with a suppository containing 500 mg of metronidazole plus nystatin (the latter not marketed in the United States) showed significantly higher rates of recurrence with the 37.5-mg regimen; this result suggests that higher metronidazole dosages may be important in topical intravaginal therapy. Recurrences can be significantly lessened with the twice-weekly use of suppressive intravaginal metronidazole gel. As stated above, treatment of male partners with metronidazole does not prevent recurrence of bacterial vaginosis.

Efforts to replenish numbers of vaginal lactobacilli that produce hydrogen peroxide and probably sustain vaginal health have been unsuccessful. While one randomized trial of orally ingested lactobacilli found reduced rates of recurrent bacterial vaginosis, this result has not yet been either confirmed or refuted, and a randomized multicenter trial in the United States found no benefit of repeated intravaginal inoculation of a vaginal peroxide-producing *Lactobacillus* species following treatment of bacterial vaginosis with metronidazole. A meta-analysis of 18 studies concluded that bacterial vaginosis during pregnancy substantially increased the risk of preterm delivery and of spontaneous abortion. However, most studies of topical intravaginal treatment of bacterial vaginosis with clindamycin during pregnancy have not reduced adverse pregnancy outcomes. Numerous trials of oral metronidazole treatment during pregnancy have given inconsistent results, and a 2013 Cochrane review concluded that antenatal treatment of women with

bacterial vaginosis—even those with previous preterm delivery—did not reduce the risk of preterm delivery. The U.S. Preventive Services Task Force thus recommends against routine screening of pregnant women for bacterial vaginosis.

**Vulvovaginal Pruritus, Burning, or Irritation** Vulvovaginal candidiasis produces vulvar pruritus, burning, or irritation, generally without symptoms of increased vaginal discharge or odor. Genital herpes can produce similar symptoms, with lesions sometimes difficult to distinguish from the fissures and inflammation caused by candidiasis. Signs of vulvovaginal candidiasis include vulvar erythema, edema, fissures, and tenderness. With candidiasis, a white scanty vaginal discharge sometimes takes the form of white thrush-like plaques or cottage cheese-like curds adhering loosely to the vaginal epithelium. *C. albicans* accounts for nearly all cases of symptomatic vulvovaginal candidiasis, which probably arise from endogenous strains of *C. albicans* that have colonized the vagina or the intestinal tract. Complicated vulvovaginal candidiasis includes cases that recur four or more times per year; are unusually severe; are caused by non-*albicans* *Candida* species; or occur in women with uncontrolled diabetes, debilitation, immunosuppression, or pregnancy.

In addition to compatible clinical symptoms, the diagnosis of vulvovaginal candidiasis usually involves the demonstration of pseudohyphae or hyphae by microscopic examination of vaginal fluid mixed with saline or 10% KOH or subjected to Gram's staining. Microscopic examination is less sensitive than culture but correlates better with symptoms. Culture is typically reserved for cases that do not respond to standard first-line antimycotic agents and is undertaken to rule out imidazole or azole resistance (often associated with *Candida glabrata*) or before the initiation of suppressive antifungal therapy for recurrent disease.

### TREATMENT VULVOVAGINAL PRURITUS, BURNING, OR IRRITATION

Symptoms and signs of vulvovaginal candidiasis warrant treatment, usually intravaginal administration of any of several imidazole antibiotics (e.g., miconazole or clotrimazole) for 3–7 days or of a single dose of oral fluconazole (Table 163-5). Over-the-counter marketing of such preparations has reduced the cost of care and made treatment more convenient for many women with recurrent yeast vulvovaginitis. However, most women who purchase these preparations do not have vulvovaginal candidiasis, whereas many do have other vaginal infections that require different treatment. Therefore, only women with classic symptoms of vulvar pruritus and a history of previous episodes of yeast vulvovaginitis documented by an experienced clinician should self-treat. Short-course topical intravaginal azole drugs are effective for the treatment of uncomplicated vulvovaginal candidiasis (e.g., clotrimazole, two 100-mg vaginal tablets daily for 3 days; or miconazole, a 1200-mg vaginal suppository as a single dose). Single-dose oral treatment with fluconazole (150 mg) is also effective and is preferred by many patients. Management of complicated cases (see above) and those that do not respond to the usual intravaginal or single-dose oral therapy often involves prolonged or periodic oral therapy; this situation is discussed extensively in the 2010 CDC STD treatment guidelines (<http://www.cdc.gov/std/treatment>). Treatment of sexual partners is not routinely indicated.

**Other Causes of Vaginal Discharge or Vaginitis** In the ulcerative vaginitis associated with staphylococcal toxic shock syndrome, *Staphylococcus aureus* should be promptly identified in vaginal fluid by Gram's stain and by culture. In desquamative inflammatory vaginitis, smears of vaginal fluid reveal neutrophils, massive vaginal epithelial-cell exfoliation with increased numbers of parabasal cells, and gram-positive cocci; this syndrome may respond to treatment with 2% clindamycin cream, often given in combination with topical steroid preparations for several weeks. Additional causes