

Vaginal Discharge (Bacterial Vaginosis, Vulvovaginal Candidiasis, Trichomoniasis)

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VAGINAL DISCHARGE (BACTERIAL VAGINOSIS, VULVOVAGINAL CANDIDIASIS, TRICHOMONIASIS)

Etiology

- The three infections most commonly associated with vaginal discharge in adult women are:
 - *Bacterial vaginosis* (BV)
 - *Vulvovaginal candidiasis* (VVC)
 - *Trichomoniasis*
- On occasion, vaginal discharge may be seen in cervicitis caused by *Neisseria gonorrhoeae* or *Chlamydia trachomatis*.
- Non-infectious causes of vaginal discharge include the following:
 - Excessive physiologic secretions
 - Desquamative inflammatory vaginitis
 - Atrophic vaginitis (scant discharge)
 - Foreign bodies
- Non-infectious causes of vulvovaginal pruritus without discharge should also be considered:
 - Irritant or allergic dermatitis (e.g., latex, soaps, perfumes)
 - Skin disorders, such as the following:
 - Lichen sclerosus (may increase the risk of vulvar cancer)
 - Squamous cell hyperplasia
 - Lichen planus
 - Psoriasis

Bacterial vaginosis

- Most common cause of vaginal discharge.
- Characterized by an overgrowth of genital tract organisms (e.g., *Gardenerella*, *Prevotella*, *Mobiluncus* spp.) and a depletion of lactobacilli.
- Not usually considered sexually transmitted.

Vulvovaginal candidiasis

- Approximately 90% of cases caused by *Candida albicans*; remainder caused by other *Candida* spp. (e.g., *C. glabrata*) or *Saccharomyces cerevisiae*.
- Not usually considered sexually transmitted.

Trichomoniasis

- Caused by *Trichomonas vaginalis*, a protozoa.
- Sexually transmitted.

Epidemiology

- Vaginal complaints are common in primary care and are among the most common reasons for gynecological consultation.

Bacterial vaginosis

- Prevalence has been estimated at 10–30% of pregnant women and 10% of family practice patients.^{1,2}
- **BV during pregnancy is associated with premature rupture of the membranes, chorioamnionitis, preterm labour, preterm birth and post-caesarean delivery endometritis.**³
- The presence of BV during an invasive procedure, such as placement of an intrauterine device (IUD), endometrial biopsy or uterine curettage, has been associated with post-procedure pelvic inflammatory disease and vaginal cuff cellulitis.^{4,5}
- **Presence of BV is associated with increased acquisition of HIV.**^{6,7}

Vulvovaginal candidiasis

- Approximately 75% of women will experience at least one episode of VVC during their lifetime, and 5–10% have more than one episode.⁸
- The incidence of recurrent VVC (four or more symptomatic episodes of VVC a year) has been estimated at 5% of women of reproductive age.⁸
- Among HIV-positive women, lower CD4 counts and high viral loads are associated with persistent *Candida* colonization and an increased incidence of VVC.^{9–12}

Trichomoniasis

- The prevalence of trichomoniasis has not been well determined. In one study in a US sexually transmitted infection (STI) clinic, the prevalence was estimated to range from 10–35%; however, these data are not likely to be generalizable.¹³ Among men attending STI clinics, the prevalence has been estimated at 3–20%.¹³
- **Trichomoniasis is associated with an increased risk of HIV acquisition and transmission in women.**^{13–15}

Prevention

- Predisposing factors for BV and VVC are listed in Table 1.
- Trichomoniasis is sexually transmitted and can be prevented by practising safer sex.

Manifestations and Diagnosis

- The symptoms and signs associated with these infections are not specific (see Table 1).
- Definitive diagnosis is based on laboratory testing.¹⁶

Table 1. Diagnostic features and laboratory diagnosis

	Bacterial vaginosis	Candidiasis	Trichomoniasis
Sexual transmission	<ul style="list-style-type: none"> • Not usually considered sexually transmitted 	<ul style="list-style-type: none"> • Not usually considered sexually transmitted 	<ul style="list-style-type: none"> • Sexually transmitted
Predisposing factors	<ul style="list-style-type: none"> • Often absent • More common if sexually active • New sexual partner • IUD use 	<ul style="list-style-type: none"> • Often absent • More common if sexually active • Current or recent antibiotic use • Pregnancy • Corticosteroids • Poorly controlled diabetes • Immuno-compromised 	<ul style="list-style-type: none"> • Multiple partners
Symptoms	<ul style="list-style-type: none"> • Vaginal discharge • Fishy odour • 50% asymptomatic 	<ul style="list-style-type: none"> • Vaginal discharge • Itch • External dysuria • Superficial dyspareunia • Up to 20% asymptomatic 	<ul style="list-style-type: none"> • Vaginal discharge • Itch • Dysuria • 10–50% asymptomatic
Signs	<ul style="list-style-type: none"> • White or grey, thin, copious discharge 	<ul style="list-style-type: none"> • White, clumpy, curdy discharge • Erythema and edema of vagina and vulva 	<ul style="list-style-type: none"> • Off-white or yellow, frothy discharge • Erythema of vulva and cervix (“strawberry cervix”)

IUD=intrauterine device

Table 1. Diagnostic features and laboratory diagnosis (continued)

	Bacterial vaginosis	Candidiasis	Trichomoniasis
Vaginal pH	• >4.5	• <4.5	• >4.5
Wet mount	• PMNs • Clue cells*	• Budding yeast • Pseudohyphae	• Motile flagellated protozoa (38–82% sensitivity) [†]
Gram stain	• Clue cells* • Decreased normal flora • Predominant Gram-negative curved bacilli and coccobacilli	• PMNs • Budding yeast • Pseudohyphae	• PMNs • Trichomonads
Whiff test	• Positive	• Negative	• Negative
Preferred treatment (see Tables 3–9)	• Metronidazole • Clindamycin	• Antifungals	• Metronidazole • Treat partner

PMN = polymorphonuclear leukocytes

* Clue cells are vaginal epithelial cells covered with numerous coccobacilli.

† Culture is more sensitive than microscopy for *T. vaginalis*.

Specimen collection

- Speculum examination.
- Rule out cervicitis.
- Collect a sample of the discharge from the vaginal wall for microscopy (if microscopy is not available on-site, see *Figure 1* for syndromic management).
- Although not a sensitive test, Gram stain may be helpful in diagnosing mucopurulent cervicitis (MPC) and gonorrhea in symptomatic females.
- A negative wet mount does not rule out an infectious cause of vaginitis.
- Culture is rarely needed in acute cases of vaginitis.

Table 2. Specimen collection

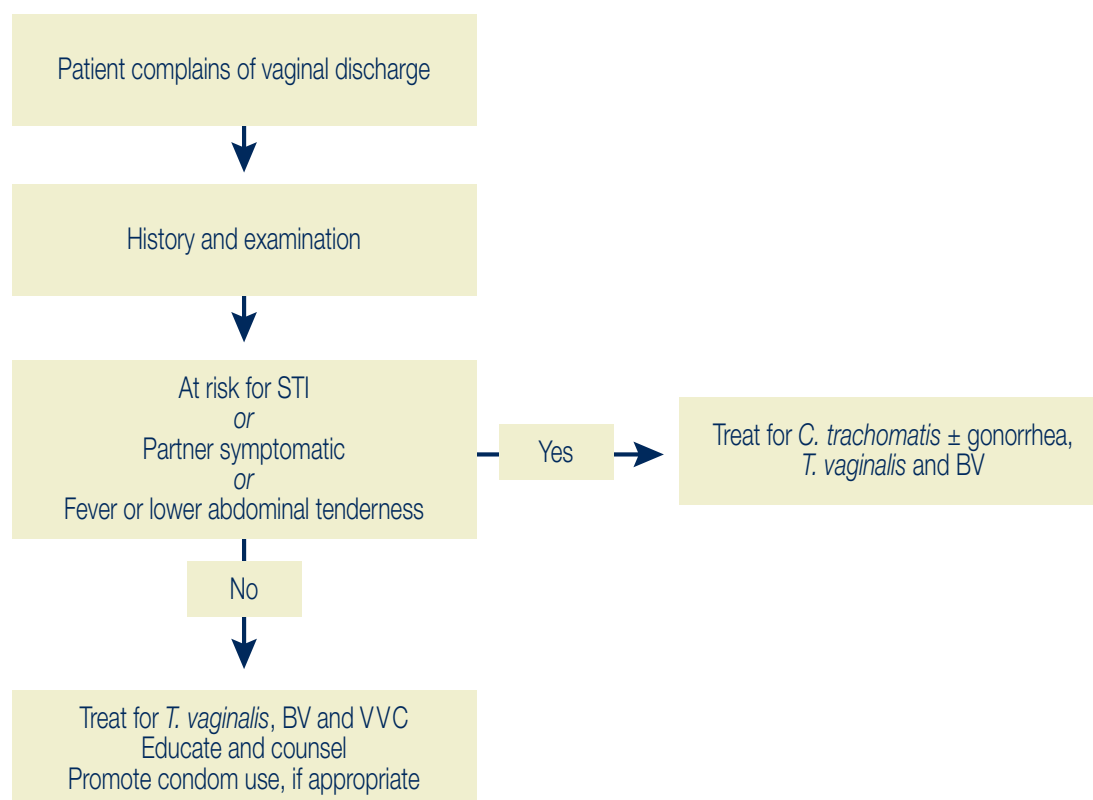
Test	Procedure	Normal result
pH test	<ul style="list-style-type: none">• Use narrow-range pH paper	pH \leq 4.5
Wet mount	<ul style="list-style-type: none">• Place a drop of vaginal discharge on a slide; mix with a drop of 0.9% saline*; apply a cover slip; examine immediately under a microscope at low and high power• Examine for leukocytes, clue cells[†], lactobacilli, yeast and trichomonads	Epithelial cells and rare white blood cells
Whiff test/ KOH slide (optional)	<ul style="list-style-type: none">• Place a drop of discharge on a slide; mix with a drop of 10% KOH; an amine (fishy) odour after applying the KOH is a positive test; apply a cover slip; examine under a microscope at low and high power• Examine for yeast	Negative
Gram stain		Predominantly large Gram-positive bacilli

* While KOH destroys cellular debris and allows one to more clearly detect yeast cells and hyphae, it also destroys the epithelial cells in clue cells needed to diagnose BV and lyses trichomonads. Therefore, for vaginitis, saline is necessary.

[†] Clue cells are vaginal epithelial cells covered with numerous coccobacilli.

Figure 1. Syndromic management of vaginal discharge

For situations where on-site microscopy is not available, the World Health Organization has developed an algorithm for management of vaginal discharge.¹⁷



BV = bacterial vaginosis

STI = sexually transmitted infection

VVC = vulvovaginal candidiasis

Consideration for Other STIs

- In a case of trichomoniasis, other STIs need to be considered. If appropriate, based on the patient's and partner's risk factors (and immunization status in the case of hepatitis B), specimens can be taken for the following:
 - Gonorrhoea and chlamydia
 - Syphilis
 - HIV
 - Hepatitis B
- Discuss HPV vaccine with women as per the recommendations outlined in the Canada Communicable Disease Report, Volume 33 ACS-2, (2007) *National Advisory Committee on Immunization (NACI) statement on Human papillomavirus vaccine.*

BACTERIAL VAGINOSIS

Management and Treatment

Table 3. Treatment of bacterial vaginosis

Asymptomatic	Symptomatic
<p>Treatment is unnecessary except in cases of:</p> <ul style="list-style-type: none"> • High-risk pregnancy (history of preterm delivery) • Prior to IUD insertion • Prior to gynecologic surgery, therapeutic abortion or upper tract instrumentation 	<p><i>Preferred</i></p> <ul style="list-style-type: none"> • Metronidazole 500 mg PO bid for 7 days • Metronidazole gel 0.75%, one applicator (5 g) once a day intravaginally for 5 days • Clindamycin cream 2%, one applicator (5 g) intravaginally once a day for 7 days <p><i>Alternatives</i></p> <ul style="list-style-type: none"> • Metronidazole 2 g PO in a single dose • Clindamycin 300 mg PO bid for 7 days
<ul style="list-style-type: none"> • For therapy with metronidazole, a 7 day oral course and a 5 day course of gel are equally efficacious (cure rate 75–85%).^{18–20} A single oral dose also has a cure rate of 85% but a higher relapse rate at 1 month (35–50% vs. 20–33%) [A-I] ²¹ • In one study, clindamycin cream was equivalent to both metronidazole regimens (cure rate of 75–86%) [A-I] ²⁰ 	

IUD=intrauterine device

Notes:

- Patients should not drink alcohol during and for 24 hours after oral therapy with metronidazole because of a possible disulfiram (antabuse) reaction.
- Clindamycin cream is oil-based and may cause latex condoms or diaphragms to fail.

Recurrent bacterial vaginosis

- 15–30% of patients develop a recurrence in the first 1–3 months after treatment.²²
- Reconfirm diagnosis.

Table 4. Treatment of recurrent bacterial vaginosis

<ul style="list-style-type: none"> • Metronidazole 500 mg PO bid for 10–14 days [B-III] ^{22,23} • Metronidazole gel 0.75%, one applicator (5 g) once a day intravaginally for 10 days, followed by suppressive therapy of metronidazole gel twice a week for 4–6 months [B-III] ²⁴

Note:

- Patients should not drink alcohol during and for 24 hours after oral therapy with metronidazole because of a possible disulfiram (antabuse) reaction.

Reporting and Partner Notification

- Bacterial vaginosis is not a reportable disease.
- Treatment of male sexual partners is not indicated and does not prevent recurrence.

Follow-up

- No follow-up is necessary unless the patient is pregnant or symptoms recur.

Special Considerations

Pregnancy

- BV during pregnancy is associated with premature rupture of the membranes, chorioamnionitis, preterm labour, preterm birth and post-cesarean delivery endometritis.
- Routine screening for BV during pregnancy is not recommended, although evidence is available to support screening and treatment at 12–16 weeks in high-risk pregnancies (see *Pregnancy* chapter). However, symptomatic women should be tested and treated.

- Treatment of asymptomatic BV in women with a previous preterm birth may reduce the risk of preterm prelabour rupture of the membranes and low birth weight [B-I].^{25,26} Treat with oral antibiotics: oral metronidazole and clindamycin are not contraindicated during pregnancy or breastfeeding.^{26–31} Topical antibiotics have no effect on preterm birth, though **topical clindamycin treatment has been associated with adverse outcomes in the newborn when used in pregnancy** (see *Pregnancy* chapter).

- Testing should be repeated after 1 month to ensure that therapy was effective.

HIV

- The same therapy is recommended for HIV-positive as for HIV-negative patients.



VULVOVAGINAL CANDIDIASIS

Management and Treatment

Uncomplicated vulvovaginal candidiasis

Table 5. Treatment of uncomplicated vulvovaginal candidiasis

Asymptomatic	Symptomatic
Treatment is unnecessary	<ul style="list-style-type: none">• Intravaginal, over-the-counter azole ovules and creams (e.g., clotrimazole, miconazole)• Fluconazole 150 mg PO in a single dose. (Contraindicated in pregnancy)
<ul style="list-style-type: none">• Topical and oral azoles are equally effective [A-I].³² Efficacy estimated at 80–90%³²• In most cases, expect resolution of symptoms in 2–3 days	

Note:

- Oil-based ovules and creams may cause latex condoms or diaphragms to fail.

Complicated vulvovaginal candidiasis

- Defined as recurrent VVC, severe VVC, a non-*albicans* species or occurring in a compromised host.

Recurrent VVC (RVVC)

- Four or more episodes of VVC in a 12-month period.
- Confirm the diagnosis of RVVC by obtaining a vaginal culture and full identification of the isolated species, which should be used to guide therapy. Non-*albicans* *Candida* species are found in 10–20% of patients with RVVC.³³ Conventional antifungal therapy is not as effective against some of these species (see *Table 8*).
- Treatment requires induction, usually followed by a 6-month maintenance regimen (see *Table 6*).
- For patients prone to RVVC who require a course of antibiotics, prophylactic topical or oral azoles, such as fluconazole 150 mg PO, can be given at the start of the antibiotic course and once a week during the duration of the course [B-III].⁸

Table 6. Treatment of recurrent vulvovaginal candidiasis (RVVC)

Induction treatment
<ul style="list-style-type: none">• Fluconazole 150 mg PO once every 72 hours for three doses [A-I].³⁴ Efficacy 92%. Contraindicated in pregnancy• Topical azole for 10–14 days [B-II] ^{35–38}• Boric acid 300–600 mg gelatin capsule intravaginally once a day for 14 days [B-II]^{39,40} Less mucosal irritation experienced when 300 mg used.⁴⁰ Efficacy approximately 80%.⁴⁰ Contraindicated in pregnancy

Notes:

- Each individual episode of RVVC caused by *C. albicans* usually responds to a course of oral or topical azoles, with a longer course usually more effective than a shorter one.³⁶
- Without maintenance therapy, VVC recurs in 50% of patients within 3 months.
- Start maintenance therapy as soon as initial treatment has been completed.

Maintenance treatment
<ul style="list-style-type: none">• Fluconazole 150 mg PO once a week [A-I].³⁴ Recurrence occurred in 10% while receiving therapy• Ketoconazole 100 mg PO once a day [A-I].⁴¹ Recurrence occurred in 5% while receiving therapy. Patients receiving long-term ketoconazole should be monitored for hepatotoxicity (incidence one in 12,000)• Itraconazole 200–400 mg PO once a month [A-I].^{42,43} Recurrence occurred in 36% while receiving therapy⁴³• Clotrimazole 500 mg intravaginally once a month [A-I]⁴⁴• Boric acid 300 mg capsule intravaginally for 5 days each month beginning the first day of the menstrual cycle [B-II].⁴⁰ Recurrence occurred in 30% while receiving therapy⁴⁰

Notes:

- Duration of maintenance therapy is a minimum of 6 months. After 6 months, discontinue therapy and observe.
- Relapse rate is high, with approximately 60% of women relapsing within 1–2 months of discontinuing maintenance therapy.^{8,36}
- If recurrence occurs, treat the episode and then reintroduce a maintenance regimen.
- **Fluconazole and boric acid are contraindicated in pregnancy.**
- Oil-based ovules and creams may cause latex condoms or diaphragms to fail.

VVC=vulvovaginal candidiasis

Severe VVC

- Extensive vulvar erythema, edema, excoriation or fissure formation.

Table 7. Treatment of severe vulvovaginal candidiasis

- **Fluconazole** 150 mg PO once every 72 hours for two doses [A-I].³³
Contraindicated in pregnancy
- **Topical azole** for 10–14 days [B-III]^{8,35,37,38}

Note:

- Oil-based ovules and creams may cause latex condoms or diaphragms to fail.

Non-albicans VVC

- Most commonly due to *C. glabrata*, which is 10- to 100-fold less susceptible to azoles than *C. albicans*.⁸

Table 8. Treatment of non-albicans vulvovaginal candidiasis

Initial treatment

- **Boric acid** 600 mg capsule intravaginally once a day for 14 days [B-II].^{38,39,45,46}
Efficacy 64–81%. Vaginal burning reported in <10%
- **Flucytosine cream** 5 g intravaginally once a day for 14 days [B-II].^{46,47} Efficacy 90%
- **Amphotericin B** 50 mg suppository intravaginally once a day for 14 days [B-III].⁴⁸
Efficacy 80% (10 patients). Mild external irritation reported in 10%
- **Flucytosine** 1 g PLUS **amphotericin B** 100 mg (combined in a lubricating jelly) administered intravaginally once a day for 14 days [B-III].^{49,50} Efficacy 100% (in 4 patients)

If symptoms recur

- Retreat with **boric acid** 600 mg capsule intravaginally once a day for 14 days FOLLOWED BY: alternate-day **boric acid** for several weeks OR 100,000 units of **nystatin** vaginal suppositories once a day for 3-6 months [B-III]⁸

Note:

- No safety data available for long-term use of boric acid.⁵¹

Compromised host

- Corticosteroids, uncontrolled diabetes.
- *C. glabrata* and other non-*albicans* species are isolated more frequently in women with diabetes than in those without.
- Treat with a longer (10–14 day) course of an **intravaginal azole** [B-III] OR **boric acid** 600 mg capsule intravaginally once a day for 14 days [B-II].^{37,38}

Reporting and Partner Notification

- Vulvovaginal candidiasis is not a reportable disease.
- Routine screening and treatment of male partners is not indicated.⁵²⁻⁵⁴ However, male sexual partners should be treated if *Candida* balanitis is present. Use a topical azole cream twice a day for 7 days.

Follow-up

- No follow-up necessary unless symptoms persist or recur.
- Consider culture and sensitivity of yeast if not responding to appropriate therapy or if infection recurs.

Special Considerations

Pregnancy

- Only topical azoles are recommended for treatment of vulvovaginal candidiasis during pregnancy. Treatment for 7 days may be necessary.⁵⁵

HIV

- The treatment of candidiasis is the same in HIV-positive as it is in HIV-negative individuals.
- Vaginal candidiasis is often recurrent and more severe in HIV-positive women and, in some cases, will require more aggressive and long-term therapy.

TRICHOMONIASIS

Management and Treatment

Table 9. Treatment of trichomoniasis

<ul style="list-style-type: none">• Metronidazole 2 g PO in a single dose [A-I]⁵⁶• Metronidazole 500 mg PO bid for 7 days [A-I]⁵⁶
<ul style="list-style-type: none">• Efficacy 82–88% for both regimens; increases to 95% if partner also treated⁵⁶• Intravaginal metronidazole gel is not effective

Note:

- Patients should not drink alcohol during and for 24 hours after oral therapy with metronidazole because of a possible disulfiram (antabuse) reaction.

Reporting and Partner Notification

- Trichomoniasis is a reportable disease in some jurisdictions.
- Current partners should be treated for trichomoniasis, regardless of symptoms (it is not necessary to screen partners for trichomonas). The majority of men infected with *T. vaginalis* are asymptomatic, but some may have mild urethritis. Treat sexual partners with the same therapy as recommended for the case.

Follow-up

- No follow-up necessary unless symptoms recur; usually due to reinfection.
- Prevalence of metronidazole-resistant *T. vaginalis* estimated at 5%. Usually responds to high-dose metronidazole.⁵⁷

Special Considerations

Pregnancy

- Trichomoniasis may be associated with premature rupture of the membranes, preterm birth and low birth weight.
- Symptomatic pregnant women should be treated with **metronidazole** 2 g PO in a single dose for symptom relief [A-I]. An alternative treatment is **metronidazole** 500 mg PO bid for 7 days [A-I]. It is not known whether treatment will improve pregnancy outcomes.^{58,59}
- It is not recommended that asymptomatic pregnant women be treated [D-I].⁶⁰
- Metronidazole is not contraindicated during pregnancy or breastfeeding.^{26–31}

HIV

- The same therapy is recommended for HIV-positive as for HIV-negative patients.

The Use of Live *Lactobacilli* to Restore Normal Vaginal Flora

- Lactobacilli preparations are commonly used in the treatment of BV and VVC. One small randomized trial in healthy women showed that the use of oral *Lactobacilli* was safe and resulted in increased vaginal *Lactobacilli* and decreased yeast as compared to the placebo group.⁶¹ However, in a more recent, well-conducted randomized, controlled trial of 278 women, oral and vaginal *L. rhamnosus* was ineffective in the prevention of post-antibiotic VVC.⁶²
- Two randomized, controlled trials have studied the use of a topical *L. acidophilus*–low dose estriol combination, one in the management of BV, the other for several infections (BV, VVC, trichomoniasis).^{63,64} Both showed a statistically significant greater reduction in symptoms and microscopic restoration of normal flora than the placebo group.