Common sexually transmitted infection; a pharmacotherapy approach; 2021 update

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Vulvovaginal Candidiasis

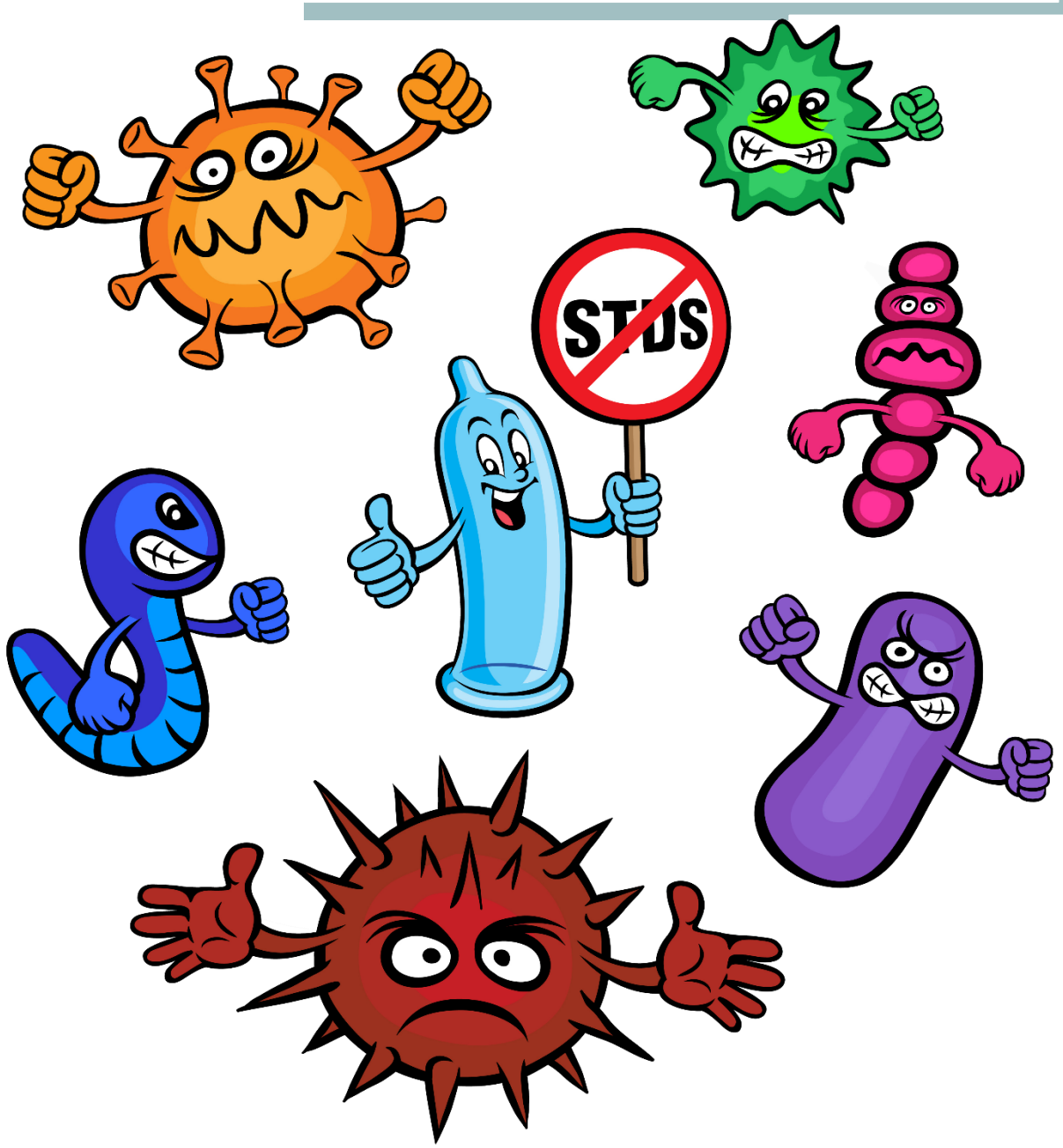
Trichomonas vaginalis

Bacterial vaginosis (BV)

Gonorrhea

Genital Herpes

Chlamydia trachomatis



➢ Vaginitis

- Vaginitis is the general term for disorders of the vagina caused by infection, inflammation, or changes in the normal vaginal flora
- The majority of women will have a vaginal infection, characterized by discharge, itching, burning, or odor, during their lifetime
- Bacterial vaginosis, Candida vulvovaginitis, and trichomoniasis (>90 percent)
- Noninfectious: vaginal atrophy/atrophic vaginitis in postmenopausal women, foreign body (eg, retained tampon or condom), irritants and allergens (eg, vaginal washes or douches), and some systemic medical disorders (eg, rheumatoid arthritis and systemic lupus).

Women with vaginitis typically present with one or more of the following nonspecific vulvovaginal symptoms:

Change in the volume, color, or odor of vaginal discharge	Pruritus
Burning	Irritation
Erythema	Dyspareunia
Spotting	Dysuria

Initial diagnostic evaluation

- Discharge – If discharge is present, what is the quantity, color, consistency, and odor?
  - **Bacterial vaginosis** (BV): The discharge of BV is typically malodorous, thin, grey (never yellow), and is a prominent complaint
  - **Vaginal candidiasis**: Vaginal candidiasis typically presents with scant discharge that is thick, white, odorless, and often curd-like.
  - **Trichomoniasis** – Trichomoniasis is characterized by purulent, malodorous discharge, which may be accompanied by burning, pruritus, dysuria, frequency, and/or dyspareunia.
- Burning, irritation, or other discomfort – Candida vulvovaginitis often presents with marked inflammatory symptoms, (pruritus and soreness). In contrast, BV is associated with only minimal inflammation and minimal irritative symptoms.

Initial diagnostic evaluation

- **Timing of symptoms:**
  - Symptoms of VVC often occur in the premenstrual period, while symptoms of trichomoniasis and BV often occur during or immediately after the menstrual period

Clinical findings in women with vaginitis

Parameter	Normal findings	Vulvovaginal candidiasis	Bacterial vaginosis	Trichomoniasis
Symptoms	None or mild, transient	Pruritus, soreness, dyspareunia	Malodorous discharge, no dyspareunia	Malodorous discharge, burning, postcoital bleeding, dyspareunia, dysuria
Signs	Normal vaginal discharge consists of 1 to 4 mL fluid (per 24 hours), which is white or transparent, thin or thick, and mostly odorless	Vulvar erythema and/or edema Discharge may be white and clumpy and may or may not adhere to vagina	Off-white/gray thin discharge that coats the vagina	Thin green-yellow discharge, vulvovaginal erythema
Vaginal pH	4.0 to 4.5	4.0 to 4.5	>4.5	5.0 to 6.0
Amine test	Negative	Negative	Positive (in 70 to 80% of patients)	Often positive
Saline microscopy	PMN:EC ratio <1; rods dominate; squames +++	PMN:EC ratio <1; rods dominate; squames +++; pseudohyphae (present in approximately 40% of patients); budding yeast for nonalbicans *Candida*	PMN:EC <1; loss of rods; increased coccobacilli; clue cells comprise at least 20% of epithelial cells (present in >90% of patients)	PMN ++++; mixed flora; motile trichomonads (present in approximately 60% of patients)
10% potassium hydroxide microscopy	Negative	Pseudohyphae (in approximately 70% of patients)	Negative	Negative
Other tests	–	If microscopy nondiagnostic: ▪ Culture ▪ DNA hybridization probe (eg, Affirm VPIII)	Quantitative Gram stain (eg, Nugent criteria, Hay/Ison criteria) DNA hybridization probe (eg, Affirm VPIII) Culture of **no** value	If microscopy nondiagnostic: ▪ Culture (eg, InPouch TV culture system) ▪ Rapid antigen test (eg, OSOM Trichomonas Rapid Test) ▪ Nucleic acid amplification test (eg, APTIMA Trichomonas vaginalis test) ▪ DNA Hybridization probe (eg, Affirm VPIII)
Differential diagnosis	Physiologic leukorrhea	Contact irritant or allergic vulvar dermatitis, chemical irritation, focal vulvitis (vulvodynia)	Elevated pH in trichomoniasis, atrophic vaginitis, and desquamative inflammatory vaginitis	Purulent vaginitis, desquamative inflammatory vaginitis, atrophic vaginitis, erosive lichen planus

Bacterial vaginosis

- A vaginal dysbiosis; replacement of normal hydrogen peroxide and lactic-acid–producing Lactobacillus species in the vagina with high concentrations of anaerobic bacteria, including G. vaginalis and other BV-associated bacteria
- BV is a highly prevalent condition and the most common cause of vaginal discharge worldwide
- The majority of women with BV were asymptomatic
- Women who have never been sexually active are rarely affected
- RF: multiple sex partners, a new sex partner, lack of condom use, douching and HSV-2,
- Male circumcision?
- BV prevalence increases during menses AND among women with copper-containing IUDs
- Hormonal contraception does not increase risk for BV and may be protect
- Vitamin D deficiency has not been reported to be a risk factor for BV

Clinical manifestations and diagnosis

- 50 to 75 percent of women with BV are asymptomatic
- Symptomatic women typically present with vaginal discharge and/or vaginal odor
- The discharge is off-white, thin, and homogeneous; the odor is an unpleasant "fishy smell" that may be more noticeable after sexual intercourse and during menses
- BV alone typically does not cause dysuria, dyspareunia, pruritus, burning, or vaginal inflammation (erythema, edema)
- The presence of these symptoms suggests mixed vaginitis (symptoms due to two pathogens)

Treatment

- Treatment for BV is recommended for women with symptoms
- Benefit of therapy: to relieve vaginal symptoms and signs of infection, reduction in the risk for acquiring C. trachomatis, N. gonorrhoeae, T. vaginalis, M. genitalium, HIV, HPV, and HSV-2
- No data are available that directly compare the efficacy of oral and topical medications
- Intravaginal Lactobacillus and other probiotic formulations? no studies support these products as an adjunctive or replacement therapy for women with BV
- Routine treatment of sex partners is not recommended
- Clindamycin cream is oil based and might weaken latex condoms and diaphragms for 5 days after use
- Women should be advised to refrain from sexual activity or to use condoms consistently and correctly during the BV treatment regimen

Recommended Regimens for Bacterial Vaginosis

Recommended Regimens for Bacterial Vaginosis

Metronidazole 500 mg orally 2 times/day for 7 days

or

Metronidazole gel 0.75% one full applicator (5 g) intravaginally, once daily for 5 days

or

Clindamycin cream 2% one full applicator (5 g) intravaginally at bedtime for 7 days

Alternative Regimens

Alternative Regimens
Clindamycin 300 mg orally 2 times/day for 7 days
or
Clindamycin ovules 100 mg intravaginally once at bedtime for 3 days*
or
Secnidazole 2 g oral granules in a single dose†
or
Tinidazole 2 g orally once daily for 2 days
or
Tinidazole 1 g orally once daily for 5 days

* Clindamycin ovules use an oleaginous base that might weaken latex or rubber products (e.g., condoms and diaphragms). Use of such products within 72 hours after treatment with clindamycin ovules is not recommended.

† Oral granules should be sprinkled onto unsweetened applesauce, yogurt, or pudding before ingestion. A glass of water can be taken after administration to aid in swallowing.

Follow-Up and Recurrence management

- All women with BV should be tested for HIV and other STIs.
- Follow-up visits are unnecessary if symptoms resolve
- Using a different recommended regimen or boric acid for women who have a recurrence
- More than 3 documented episodes of BV in the previous 12 months: long-term suppressive regimen consisting of maintenance metronidazole vaginal gel.
  - metronidazole gel 0.75% or an oral nitroimidazole for 7 to 10 days followed by twice-weekly dosing of metronidazole gel for four to six months
  - Those with a metronidazole allergy can be treated with either topical clindamycin gel or undergo metronidazole desensitization.
  - Topical clindamycin gel (2%) is less effective and increase yeast infection risk, which is why metronidazole gel is preferred

Drug Allergy, Intolerance, or Adverse Reactions

- Intravaginal clindamycin cream is preferred in case of allergy or intolerance to metronidazole or tinidazole.
- Intravaginal metronidazole gel can be considered for women who are not allergic to metronidazole but do not tolerate oral metronidazole
- Alcohol consumption during metronidazole treatment?

Pregnancy

- Treat all BV cases in symptomatic pregnant women
- Oral formulation is generally preferred.
- Metronidazole 250 mg TDS or 500 mg BD for 7 days or vaginal formulation (CDC 2021)
  - First trimester?
- Alternative: Oral or vaginal therapy with clindamycin
- Tinidazole should be avoided during pregnancy
- Routine screening in pregnancy is not recommended; may be performed and treat in cases of preterm birth high-risk with same approach

Lactation

- With maternal oral therapy, breastfed infants receive metronidazole in doses that are less than those used to treat infections among infants
- Certain clinicians recommend deferring breastfeeding for 12–24 hours after maternal treatment with a single 2-g dose of metronidazole
- Routine dose for 7-14 days produce a lower concentration in breast milk and are considered compatible with breastfeeding (taste of milk, diarrhea, diaper rash, candidiasis) (CDC, NHS)
- Topical or vaginal use of metronidazole during breastfeeding is unlikely to be of concern, although the manufacturer of one vaginal product recommends not breastfeeding during treatment and for 2 days after the last dose.
- Clindamycin has the potential to cause adverse effects on the infant's gastrointestinal flora (should be monitored for diarrhea, candidiasis (thrush, diaper rash) or, rarely, blood in the stool indicating possible antibiotic-associated colitis)

Vulvovaginal Candidiasis

- Candida albicans in 80% to 92% of cases
- Not usually described as an STD because celibate women may also experience it; however, the incidence of VVC increases when women become sexually active
- Typical symptoms of VVC include pruritus, vaginal soreness, dyspareunia, external dysuria, and abnormal vaginal discharge
- Age: Vaginal candidiasis (thrush) is common in women of childbearing age
- Pregnancy and diabetes are strong predisposing factors
- Rare in children and in postmenopausal because of the different environment in the vagina
- Refer Age < 16 or > 60

Classification of vulvovaginal candidiasis

Uncomplicated vulvovaginal candidiasis (VVC)

- Sporadic or infrequent VVC

  and
- Mild-to-moderate VVC

  and
- Likely to be *Candida albicans*

  and
- Nonimmunocompromised women

Complicated VVC

- Recurrent VVC (three or more episodes of symptomatic VVC in <1 year)

  or
- Severe VVC

  or
- Non–*albicans* candidiasis

  or
- Women with diabetes, immunocompromising conditions (e.g., HIV infection), underlying immunodeficiency, or immunosuppressive therapy (e.g., corticosteroids)

- The nonprescription antifungal agents are indicated for the treatment of VVC in women who previously were diagnosed and treated by their physician. Additional questions that should be asked by the pharmacist include current symptoms, whether they are pregnant or not, other current medical conditions or medications, and allergies.
- **Patients should be referred to a physician if any of the following are present:**
  - **First episode of VVC**
  - **Has had more than three episodes of VVC within the past 12 months**
  - **Last episode was less than 2 months ago**
  - **Is pregnant**
  - **Is younger than 12**
  - **Fever**
  - **Lower abdominal, back, or shoulder pain**
  - **Severe symptoms or**
  - **Has a malodorous vaginal discharge**

- Short-course topical formulations (i.e., single dose and regimens of 1–3 days) effectively treat uncomplicated VVC.
- Treatment with azoles results in relief of symptoms and negative cultures in 80%–90% of patients who complete therapy
- The creams and suppositories in these regimens are oil based and might weaken latex condoms and diaphragms.
- Any woman whose symptoms persist after using an over-the-counter preparation or Who has a recurrence of symptoms <2 months after treatment should be evaluated clinically and tested
- No substantial evidence exists to support using probiotics for treating VVC.
- Add topical CSs in severe inflammation for first 48 hours

- **Management of Sex Partners**: not usually acquired through sexual intercourse, and data do not support treatment of sex partners
- A minority of male sex partners have balanitis, characterized by erythematous areas on the glans the penis in conjunction with pruritus or irritation.
- These men benefit from treatment with topical antifungal agents to relieve symptoms.

Recommended Regimens for Vulvovaginal Candidiasis

Over-the-Counter Intravaginal Agents

Clotrimazole 1% cream 5 g intravaginally daily for 7–14 days

or

Clotrimazole 2% cream 5 g intravaginally daily for 3 days

or

Miconazole 2% cream 5 g intravaginally daily for 7 days

or

Miconazole 4% cream 5 g intravaginally daily for 3 days

or

Miconazole 100 mg vaginal suppository one suppository daily for 7 days

or

Miconazole 200 mg vaginal suppository one suppository for 3 days

or

Miconazole 1,200 mg vaginal suppository one suppository for 1 day

or

Tioconazole 6.5% ointment 5 g intravaginally in a single application

ORAL AZOLES

- Fluconazole is the only oral antifungal agent currently recommended by the CDC for the treatment of acute VVC. A single 150 mg oral dose of fluconazole is as effective as 3- to 6-day regimen of intravaginal clotrimazole

ADVERSE EFFECTS ASSOCIATED WITH AZOLES

- When used intravaginally, azoles are associated with dose-dependent adverse reactions similar to symptoms women report from VVC
- If the vaginal symptoms worsen after therapy is started, the patient should contact her health care provider. In addition, if symptoms have not improved within 3 days after initiation of therapy or continue past 7 days, the patient should contact her physician to rule out more severe disease or treatment of the wrong disease.

- Topical azole therapy has been associated with a variety of adverse drug reactions, including headaches, allergic contact dermatitis, vulvovaginal pruritus and irritation, dyspareunia, and general burning, soreness, genital pain
- In addition, intravaginal miconazole has been reported to interact with warfarin, increasing the risk of bleeding and bruising
- Oral fluconazole has been associated with headaches, nausea, abdominal pain, diarrhea, dyspepsia, dizziness, taste perversion, angioedema, and rare cases of anaphylactic reactions.

PATIENT COUNSELING

- To minimize leakage and annoyance, should apply the product at bedtime to increase retention in the vagina. She should be advised that the nonprescription vaginal antifungal creams and suppositories are oil based and thus may weaken condoms or diaphragms, thereby reducing their effectiveness
- Should be informed about the importance of completing a full course of therapy even if her symptoms subside beforehand and to continue her antifungal treatment through her menstrual period should it occur

SEVERE VVC

- Extensive vulvar erythema, edema, excoriation, and fissures
- May be treated with either a 7- to 14-day course of topical azoles or two oral doses of fluconazole 150 mg given 72 hours apart. Infection with non–C. albicans species should be treated with a 7- to 14-day course of an oral or intravaginal azole; however, the optimal treatment is unknown.
- Oral fluconazole has poor activity against non–C. albicans species and should not be used. Boric acid 600 mg capsules administered intravaginally once daily for 14 days can also be used, which has shown eradication rates of 70%.

RECURRENT VULVOVAGINAL CANDIDIASIS

Approximately 5% experience recurrent VVC infections defined as four or more episodes per year

Treatment of recurrent C. albicans vulvovaginitis should include a prolonged (7– 14-day) course of topical therapy or a three-dose regimen of oral fluconazole (100, 150, or 200 mg) administered every 3 days. A 6-month maintenance regimen should be initiated after remission has been achieved

Treatment of complicated vaginal candidiasis

Severe vaginitis symptoms
Oral fluconazole 150 mg every 72 hours for two or three doses (depending on severity).
OR
Topical azole antifungal therapy daily for 7 to 14 days. A low potency topical corticosteroid can be applied to the vulva for 48 hours to relieve symptoms until the antifungal drug exerts its effect.
Recurrent vulvovaginal candidiasis
Induction with fluconazole 150 mg every 72 hours for three doses, followed by maintenance fluconazole 150 mg once per week for six months. If fluconazole is not feasible, options include 10 to 14 days of a topical azole or alternate oral azole (eg, itraconazole) followed by topical maintenance therapy for six months (eg, clotrimazole 200 mg [eg, 10 g of 2%] vaginal cream twice weekly or 500 mg vaginal suppository once weekly).
Nonalbicans *Candida* vaginitis
Therapy depends upon species identified:
C. glabrata: Intravaginal boric acid* 600 mg daily for 14 days
If failure occurs: 17% topical flucytosine cream, 5 g nightly for 14 days
C. krusei: Intravaginal clotrimazole, miconazole, or terconazole for 7 to 14 days
All other species: Conventional dose fluconazole
Compromised host (eg, poorly controlled diabetes, immunosuppression, debilitation) and *Candida* isolate susceptible to azoles
Oral or topical therapy for 7 to 14 days
Pregnancy
Topical clotrimazole or miconazole for 7 days

Pregnancy

- VVC occurs frequently during pregnancy.
- Only topical azole therapies, applied for 7 days, are recommended for use among pregnant women.
- Epidemiologic studies indicate a single 150-mg dose of fluconazole might be associated with spontaneous abortion and congenital anomalies; therefore, it should not be used (Controversial for low dose)

LACTATION

- Clotrimazole is safe , if applied to the nipple it should be washed off.
- The same recommendation also exists for Miconazole
- **Fluconazole** is acceptable in nursing mothers because amounts excreted into breastmilk are less than the neonatal **fluconazole** dosage.

- Insert the antifungal product into the vagina once a day, preferably at bedtime to minimize leakage from the vagina. Use a sanitary pad or panty liner to avoid staining of underwear.
- Table 8–3 provides instructions on administering vaginal antifungals. Significant relief of symptoms should occur within 24–48 hours, and relief is often apparent within hours after the first dose. However, the length of treatment (particularly for 1- to 3-day treatments) does not directly correspond to the time of resolution of symptoms.
- Continue the therapy for the recommended length of time, even if symptoms are gone. Stopping treatment early is a common reason for recurrence of vaginal symptoms and,

- Vaginal antifungals can be used during a menstrual period. If desired, wait and treat the infection after menses ends. Do not interrupt a course of therapy if menses begins.
- Do not use tampons or douche while using a vaginal antifungal and for 3 days after use.
- Although adverse effects are uncommon, the first dose of the antifungal may cause some vaginal burning and irritation, and a few women (about 1 in 10) experience a headache.
- Refrain from sexual intercourse during treatment with the vaginal antifungal. Vaginal lubricants and vaginal spermicides should not be used at the same time as the vaginal antifungal. Vaginal antifungals can damage latex condoms and diaphragms and may result in unreliable contraceptive effects. Do not use these contraceptives during therapy or for 3 days after therapy, because the antifungal medication remains in the vagina for several days.

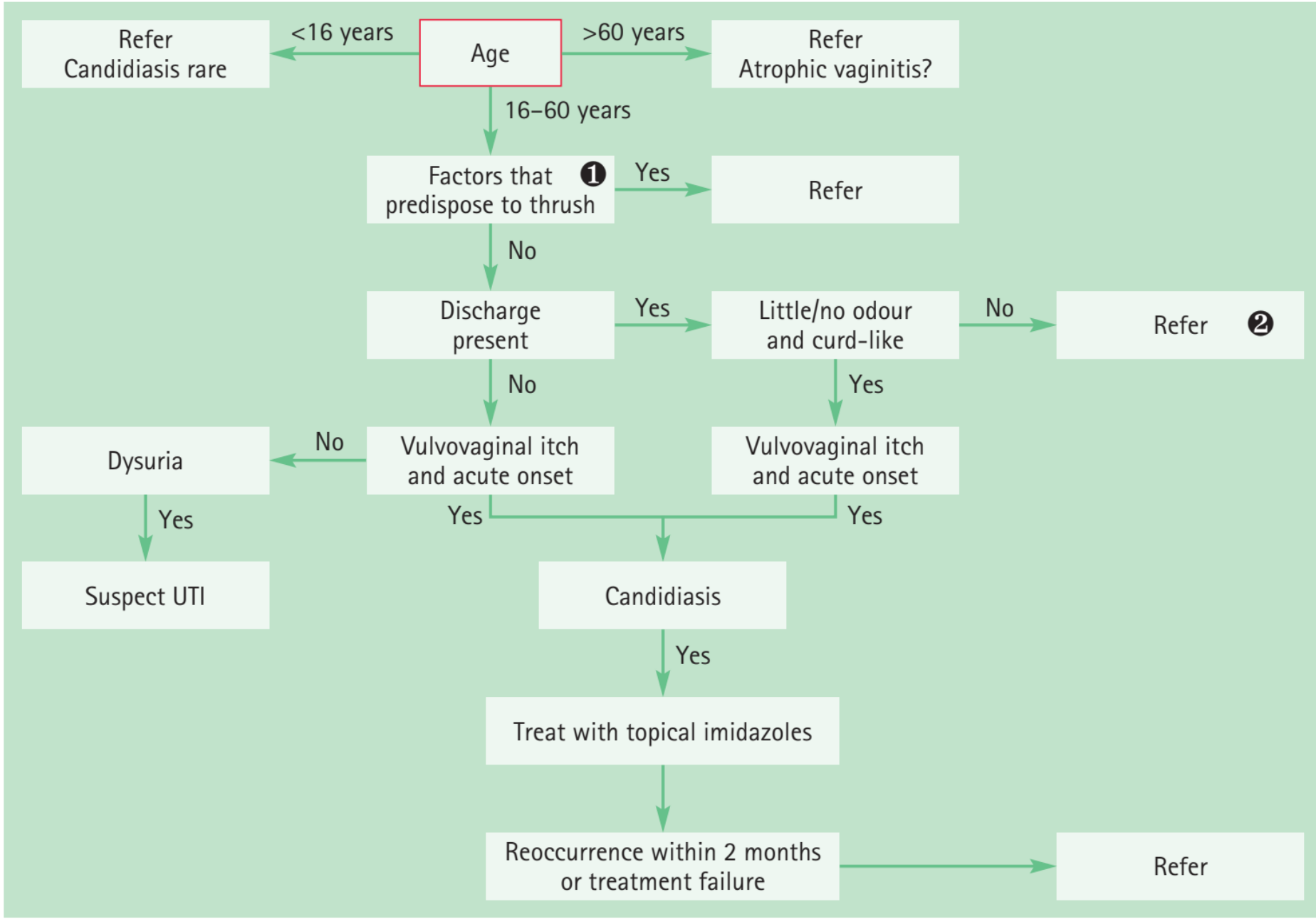

Refer
Candidiasis rare
<16 years
Age
>60 years
Refer
Atrophic vaginitis?
16–60 years
Factors that predispose to thrush ❶
Yes
Refer
No
Discharge present
Yes
Little/no odour and curd-like
No
Refer ❷
No
Yes
Dysuria
No
Vulvovaginal itch and acute onset
Vulvovaginal itch and acute onset
Yes
Yes
Yes
Suspect UTI
Candidiasis
Yes
Treat with topical imidazoles
Reoccurrence within 2 months or treatment failure
Refer

Table 6.6
Practical prescribing: Summary of medicines for thrush

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Imidazoles	Not applicable	Vaginal irritation	None	None	OK, but pregnant women should be referred; OK in breastfeeding
Fluconazole		GI disturbances, headache, rash	Anticoagulants, ciclosporin, rifampicin, phenytoin, tacrolimus		Avoid

GI, Gastrointestinal.

Trichomoniasis

- Caused by the protozoan Trichomonas vaginalis and is far more prevalent than C. trachomatis or N. gonorrhoeae
- The most prevalent non-viral STI worldwide; is virtually always sexually transmitted
- Women are affected more often than men.
- Women generally have a malodorous, yellow-green vaginal discharge and vaginal irritation, thin discharge with associated burning, pruritus, dysuria, frequency, and dyspareunia
- Males are often asymptomatic, but have developed urethritis

- The diagnosis of T. vaginalis is based on laboratory testing (motile trichomonads on wet mount) positive culture, positive nucleic acid amplification test [NAAT], or positive rapid antigen or nucleic acid probe test).
- None of the clinical features of trichomoniasis is sufficiently sensitive or specific to allow a diagnosis based upon signs and symptoms alone
- Diagnosis most sensitive with NAAT, many times detecting five times more T. vaginalis infections than wet-mount microscopy

Treatment

- Treatment reduces symptoms and signs of T. vaginalis infection and might reduce transmission
- The study demonstrated that multidose metronidazole (500 mg orally 2 times/day for 7 days) reduced the proportion of women retesting positive at a 1-month test of cure visit by half, compared with women who received the 2-g single dose
- No published randomized trials are available that compare these doses among men
- The nitroimidazoles are the only class of medications with clinically demonstrated efficacy against T. vaginalis infections.
- Tinidazole is usually more expensive, reaches higher levels in serum and the genitourinary tract, has a longer half-life than metronidazole (12.5 hours versus 7.3 hours), and has fewer gastrointestinal side effects

Treatment

- Metronidazole gel does not reach therapeutic levels in the urethra and perivaginal glands. Because it is less efficacious than oral metronidazole, it is not recommended
- Providers should advise persons with T. vaginalis infections to abstain from sex until they an their sex partners are treated (i.e., when therapy has been completed and any symptoms have resolved).
- Testing for other STIs, including HIV, syphilis, gonorrhea, and chlamydia, should be performed
- Retesting for T. vaginalis is recommended for all sexually active women <3 months after initial treatment regardless of whether they believe their sex partners were treated
- Concurrent treatment of all sex partners is vital for preventing reinfections. Current partners should be referred for presumptive therapy.

Recommended Regimen for Trichomoniasis

Recommended Regimen for Trichomoniasis Among Women

Metronidazole 500 mg orally 2 times/day for 7 days

Recommended Regimen for Trichomoniasis Among Men

Metronidazole 2 g orally in a single dose

Alternative Regimen for Women and Men

Tinidazole 2 g orally in a single dose

Treatment of failure or recurrent cases

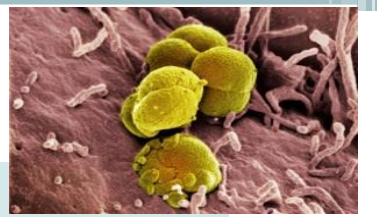
- Metronidazole resistance occurs in 4%–10% of cases of vaginal trichomoniasis
- Tinidazole resistance is less well studied but was present in 1% of infections in one study
- If treatment failure occurs in a woman after completing a regimen of metronidazole 500 mg 2 times/day for 7 days and she has been re-exposed to an untreated partner, a repeat course of the same regimen is recommended.
- If no re-exposure has occurred, she should be treated with metronidazole or tinidazole 2 g once daily for 7 days.
- High-dose oral tinidazole (1 g 3 times/day) plus intravaginal paromomycin (4 g of 6.25% intravaginal paromomycin cream nightly) for 14 days should be considered in some cases

Drug Allergy, Intolerance, or Adverse Reactions

- Metronidazole and tinidazole are both nitroimidazoles.
- Patients with an IgE-mediated-type hypersensitivity reaction to 5-nitroimidazole antimicrobials should be managed by metronidazole desensitization according to published regimens
- Paromomycin or boric acid for patients with T. vaginalis who are unable to be desensitized

- **Pregnancy**
  - Multiple-dose regimens is preferred (less N/V)
  - Single-dose regimen is alternative
  - Avoid tinidazole esp. in first trimester
  - Although clotrimazole 1% cream inserted vaginally often results in symptomatic relief, it does not eradicate the organisms and therefore is not advised
- **Breastfeeding individuals**
  - Multiple-dose regimens is preferred
  - Single-dose therapy is a reasonable alternative (deferring breastfeeding for 12 to 24 hours following administration)

Gonococcal Infections



- A curable STI caused by the gram-negative diplococcus *Neisseria gonorrhoeae*
- The highest rate of gonococcal infection is seen within the 15- to 24-year-old age groups for both sexes; more cases are reported in men.
- Most genital gonococcal infections in women are asymptomatic
- The cervix is the most commonly infected mucosal site in women
- When symptomatic, gonococcal cervical infection can present with the typical findings of cervicitis, including vaginal pruritus and a mucopurulent cervical discharge
- Some women may also have symptomatic involvement of the urethra (dysuria) or PID

- When symptomatic in men, gonococcal urethritis often manifests with dysuria and copious purulent discharge
- Extragenital sites of infection include the rectum and pharynx.
- Disseminated infection often manifests as purulent arthritis
- Nucleic acid amplification testing (NAAT) is the preferred test for the microbiologic diagnosis
- N. gonorrhoeae not only causes similar clinical syndromes as C. trachomatis but also coexists in a significant proportion of patients with chlamydial infection.

Treatment of Uncomplicated Gonococcal Infection of the Cervix, Urethra, or Rectum; preferred regimens

- Single-agent therapy with higher dose (due to increased MIC) of ceftriaxone is the preferred regimen for treatment of gonococcal infections.
- Ceftriaxone is more effective than oral cephalosporins
- Previously recommended 125 mg to 250 mg doses are unlikely to be effective against isolates with higher MICs
- Pharyngeal infection, which is often asymptomatic and may accompany infection at other sites, is more difficult to eradicate than urogenital or anorectal gonococcal infections and may serve as a reservoir of infection, possibly related to less predictable ceftriaxone levels in the pharynx

Ceftriaxone 500 mg* IM in a single dose for persons weighing <150 kg
If chlamydial infection has not been excluded, treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.
* For persons weighing ≥150 kg, 1 g ceftriaxone should be administered.

Treatment of Uncomplicated Gonococcal Infection of the Cervix, Urethra, or Rectum; alternative regimens

- if ceftriaxone not available, a different injectable cephalosporin (eg, ceftizoxime 500 mg IM, or cefotaxime 500 mg IM) can be use for uncomplicated urogenital and anorectal gonococcal infections; no advantage and their efficacy in pharyngeal infection is less certain
- If an injectable cephalosporin is not available, cefixime is the only oral cephalosporin that can be used for gonococcal therapy; high treatment failure rates for pharyngeal infection
- Other oral cephalosporins (e.g., cefpodoxime and cefuroxime) are not recommended because of inferior efficacy and less favorable pharmacodynamics
- Dual treatment with single doses of IM gentamicin 240 mg plus oral azithromycin 2 g cured 100% of cases and can be considered an alternative to ceftriaxone for persons with cephalosporin allergy; may be an effective alternative regimen also for pharyngeal infection; higher GI AE

Treatment of Uncomplicated Gonococcal Infection of the Cervix, Urethra, or Rectum; **alternative** regimens

- Gemifloxacin (320 mg) plus azithromycin (2 gram) has been studied and is no longer recommended as an alternative regimen because of limited availability, cost, and antimicrobial stewardship concerns
- Azithromycin monotherapy for gonorrhea is not recommended.
- Spectinomycin 2 gram IM is effective (98.2% in curing uncomplicated urogenital and anorectal gonococcal infections) but has poor efficacy for pharyngeal infections.

Alternative Regimens if Ceftriaxone Is Not Available
Gentamicin 240 mg IM in a single dose *plus* **Azithromycin** 2 g orally in a single dose *or* **Cefixime*** 800 mg orally in a single dose
* If chlamydial infection has not been excluded, providers should treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

Treatment of Uncomplicated Gonococcal Infection of the Pharynx

- More difficult to eradicate than infections at urogenital and anorectal sites
- Single high dose of intramuscular (IM) ceftriaxone and presumptive treatment of chlamydia
- Cefixime and Spectinomycin should not be used
- Azithromycin plus gentamicin may be an effective alternative regimen for pharyngeal infection, but it should be reserved for patients with a severe beta-lactam allergy that precludes cephalosporin use
- A test of cure is recommended for all pharyngeal gonococcal infections
- Gargling with antiseptic mouthwash should not be relied on for treatment or prevention of pharyngeal gonococcal infection.

Recommended Regimen for Uncomplicated Gonococcal Infection of the Pharynx Among Adolescents and Adults
Ceftriaxone 500 mg* IM in a single dose for persons weighing <150 kg
* For persons weighing ≥150 kg, 1 g ceftriaxone should be administered.

Treatment of Gonococcal Conjunctivitis

- All patients with documented or suspected gonococcal conjunctivitis should be evaluated emergently by an ophthalmologist.
- Gonococcal conjunctivitis is treated with a single 1 g IM dose of ceftriaxone and presumptive treatment for chlamydia infection
- A topical fluoroquinolone, saline irrigation, and daily monitoring are also recommended because of the risk of corneal involvement and perforation
- If corneal involvement is identified or cannot be excluded, some experts recommend that the patient be hospitalized and treated with ceftriaxone 1 g intravenously every 12 to 24 hours until resolution.

Recommended Regimen for Gonococcal Conjunctivitis Among Adolescents and Adults
Ceftriaxone 1 g IM in a single dose

Treatment of Arthritis and Arthritis-Dermatitis Syndrome

Recommended Regimen for Gonococcal-Related Arthritis and Arthritis-Dermatitis Syndrome

Ceftriaxone 1 g IM or IV every 24 hours

If chlamydial infection has not been excluded, providers should treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

Alternative Regimens

Cefotaxime 1 g IV every 8 hours

or

Ceftizoxime 1 g every 8 hours

If chlamydial infection has not been excluded, providers should treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

Treatment of Gonococcal Meningitis and Endocarditis

Recommended Regimen for Gonococcal Meningitis and Endocarditis
Ceftriaxone 1–2 g IV every 24 hours If chlamydial infection has not been excluded, providers should treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

Management of Sex Partners

- Recent sex partners (i.e., persons having sexual contact with the infected patient <60 days preceding onset of symptoms or gonorrhea diagnosis) should be referred for evaluation, testing, and presumptive treatment with cefixime plus doxycycline or azithromycin
- If the patient's last potential sexual exposure was >60 days before onset of symptoms or diagnosis, the most recent sex partner should be treated.
- Patients are generally counseled to avoid sexual activity until 7 days following treatment initiation
- Patients should only resume having sex after symptoms have resolved and sex partners have been treated.

Pregnancy

- Pregnant women with uncomplicated gonorrheal infection should be treated with the same preferred regimen as the general population
- Use azithromycin rather than doxycycline for chlamydia
- Gentamicin plus azithromycin can be used as an alternate regimen for urogenital or anorectal infection during pregnancy

Management of chlamydia coinfection

- Most frequently reported bacterial infectious disease in the United State
- Multiple sequelae can result from C. trachomatis infection among women, the most serious of which include PID, ectopic pregnancy, and infertility.
- NAATs are the most sensitive tests for these specimens and are the recommended test for detecting C. trachomatis infection.
- Sex partners should be referred for evaluation, testing, and presumptive treatment if they had sexual contact with the partner during the 60 days preceding the patient's onset of symptoms or chlamydia diagnosis.

Recommended Regimen for Chlamydial Infection Among Adolescents and Adults

Doxycycline 100 mg orally 2 times/day for 7 days

Alternative Regimens

Azithromycin 1 g orally in a single dose

or

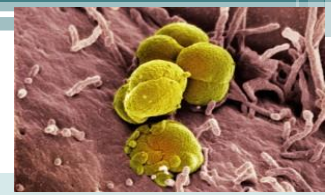
Levofloxacin 500 mg orally once daily for 7 days

Recommended Regimen for Chlamydial Infection During Pregnancy

Azithromycin 1 g orally in a single dose

Alternative Regimen

Amoxicillin 500 mg orally 3 times/day for 7 days



Genital herpes

- The majority of young, sexually active patients who have genital, anal, or perianal ulcers have either genital herpes or syphilis; genital herpes is the most prevalent of these diseases
- All persons who have genital, anal, or perianal ulcers should be evaluated.
- Types of infection:
- Primary
  - In a patient without preexisting antibodies to either HSV-1 or HSV-2
- Nonprimary
  - Preexisting antibodies either HSV-1 or HSV-2
- Recurrent
  - Reactivation of genital HSV in which the HSV type recovered in the same type as antibodies in the serum

Treatment

- All patient experiencing a first episode should be treated
  - The one exception may be patients with nonprimary infection who present only with mild symptoms after several days.
- Antiviral should be started as soon as possible after lesion appearance and within 72 hours
- Oral antiviral therapy decreases the duration and severity by days to weeks
- Treating the first episode **neither** eradicate **latent** virus nor affect the risk, frequency, or severity of recurrences after the drug is discontinued
- Acyclovir, valacyclovir, and famciclovir
- Valacyclovir is the valine ester of acyclovir and has enhanced absorption after oral administration, allowing for less frequent dosing than acyclovir
- Topical therapy with antiviral drugs offers minimal clinical benefit and is discouraged

Treatment of First Clinical Episode of Genital Herpes

- Even persons with first-episode herpes who have mild clinical manifestations initially can experience severe or prolonged symptoms during recurrent infection.
- Therefore, all patients with first episodes of genital herpes should receive antiviral therapy
- Antiviral should be started as soon as possible after lesion appearance and within 72 hours

Recommended Regimens for First Clinical Episode of Genital Herpes*
Acyclovir† 400 mg orally 3 times/day for 7–10 days *or* **Famciclovir** 250 mg orally 3 times/day for 7–10 days *or* **Valacyclovir** 1 g orally 2 times/day for 7–10 days

* Treatment can be extended if healing is incomplete after 10 days of therapy.
† Acyclovir 200 mg orally 5 times/day is also effective but is not recommended because of the frequency of dosing.

Treatment of Recurrent HSV-2 Genital Herpes

- **Episodic therapy**: Patients start therapy at the very first sign of prodromal symptoms (eg, tingling, paresthesias, pruritus), which may occur prior to onset of discrete lesions.
- **Chronic suppressive therapy**: administration of daily antiviral; most appropriate for those with very frequent (≥6 recurrent episodes per year)/severe recurrences and/or those who wish to reduce the risk of transmission to their HSV-uninfected sexual partner
- Patients with mild symptoms may choose no treatment at all.

Recommended Regimens for Suppression of Recurrent HSV-2 Genital Herpes

Acyclovir 400 mg orally 2 times/day
or
Valacyclovir 500 mg orally once a day*
or
Valacyclovir 1 g orally once a day
or
Famciclovir 250 mg orally 2 times/day

* Valacyclovir 500 mg once a day might be less effective than other valacyclovir or acyclovir dosing regimens for persons who have frequent recurrences (i.e., ≥10 episodes/year).

Recommended Regimens for Episodic Therapy for Recurrent HSV-2 Genital Herpes*

Acyclovir 800 mg orally 2 times/day for 5 days
or
Acyclovir 800 mg orally 3 times/day for 2 days
or
Famciclovir 1 g orally 2 times/day for 1 day
or
Famciclovir 500 mg orally once, followed by 250 mg 2 times/day for 2 days
or
Famciclovir 125 mg orally 2 times/day for 5 days
or
Valacyclovir 500 mg orally 2 times/day for 3 days
or
Valacyclovir 1 g orally once daily for 5 days

* Acyclovir 400 mg orally 3 times/day for 5 days is also effective but is not recommended because of frequency of dosing.


با تشکر
از توجه
شما