



*Reviewed By*  
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## Video Case

# Lower Genital Tract Infection

### Objectives:

- List the causes of vaginal discharge
- Outline a plan for diagnosis and management for yeast, bacterial vaginosis, and trichomoniasis vulvovaginitis



- Slides
- **Important**
- **Golden notes**
- Extra
- **439 Doctor's notes**
- **441 Doctor's notes**
- **441 Female Presentation**
- **Reference**

Female presentation

Video Case | Editing File

# Vaginitis

- Valvular and vaginal conditions occur frequently and can be distressing with serious consequences
- Vaginitis-gynecology visit very common with over 10 million office visits per year
- The percent of American women who reported symptoms in the past year was 8% for Caucasian women and 18% for African-American women

^ **What are the most common causes that are at the top of the differential diagnosis ?**

- Bacterial vaginosis 20 to 25% of the time ( the most common )
- Vaginal candidiasis 17 to 39% ( 2nd most common )
- Trichomoniasis 4 to 35%

## > Symptoms :

discharge

Itching

burning

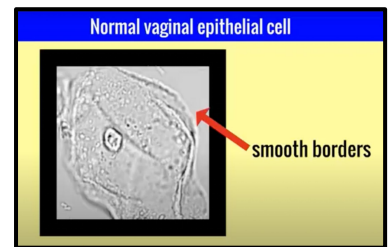
irritation

## > Diagnosis :

1- **Taking a careful history** help to narrow diagnoses.

2- A dry speculum place in vagina and **specimen of vaginal discharge** swabbed to do :

- **WET MOUNT** "The cornerstone of diagnosis" : a glass slide holding a specimen suspended in a drop of liquid (as water) for microscopic examination.
  - Normally, vaginal epithelium cell have nice smooth borders
- **pH testing** (be careful not to get cervical mucus which alter the pH of specimen) : A pH is a very helpful triage point
  - Normal pH in reproductive age women is between 3.8 to 4.5.

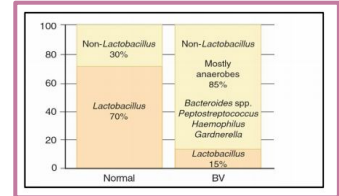


	Bacterial vaginosis	Trichomoniasis	Vaginal candidiasis
History	Copious, <b>Thin, Clear, grayish-white discharge</b>  with <b>fishy / amine odor</b> especially after intercourse because semen is alkaline.	<b>Yellow-green frothy / like cappuccino frothy discharge</b>  with <b>musty odor</b>	<b>Crudy, thick, white discharge "cottage cheese"</b>  with <b>itching</b>
Wet mount	<b>Clue cells of bacterial vaginosis that showing stippled borders of the cell &gt; 20%</b> ( cell borders obscured by anaerobic bacteria).  WBCs are rarely seen.	Actively motile <b>trichomonas organism with characteristics flagella</b>  WBCs are seen.	Blastopore, <b>pseudohyphae</b> , or Body hyphae of vulvovaginal candidiasis or yeast.  WBCs are seen.
pH testing	Greater than 4.5 (alkaline)		Less than 4.5 (acidic)

# Bacterial Vaginosis (BV)

## General information

- Bacterial vaginosis is polymicrobial infection characterized by lack of balance in the vagina there is overgrowth of anaerobic organisms and a lack of normal lactobacilli.
- The normal predominant lactobacilli are replaced by microorganisms: **Gardnerella vaginalis**, Mycoplasma hominis and vaginal anaerobic bacteria; including Prevotella, Bacteroides, and Mobiluncus Species .
- In women with BV, the concentration of anaerobes, and G. vaginalis and Mycoplasma hominis, is 100 to 1000 times higher than in normal women
- It is not a true infection, but rather an alteration in concentrations of normal vaginal bacteria.
  - Bacterial vaginosis is **not sexually transmitted**, but increased risk for pelvic inflammatory disease (PID)
- Pregnant women with BV are at risk for premature rupture of the membranes, preterm labor and delivery, chorioamnionitis, and postcesarean endometritis.



Change in Vaginal Flora with Bacterial Vaginosis

## Risk Factors

Postmenopausal women because of low levels of estrogen

New sexual partner

Smoking

Intrauterine device (IUD) use

Frequent douching

## Clinical Features

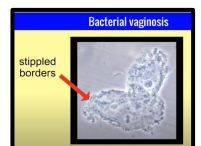
### Examination

#### History:

- Thin grayish-white vaginal discharge.
- Neither itching or burning ( No vaginal inflammation )

#### specimen:

- pH test**
- Wet mount**
- Whiff test** : +ve, it is elicited when potassium hydroxide is placed on the discharge, **releasing a fishy odor.**



## Management

- Oral or topical **metronidazole** (drug of choice) or topical **clindamycin**; Many clinicians prefer intravaginal treatment to avoid systemic side effects
  - Treatment of male sexual partner** doesn't improve therapeutic response and **isn't recommended.**
    - Metronidazole** is safe during pregnancy (including first trimester).

# Trichomonas Vaginitis


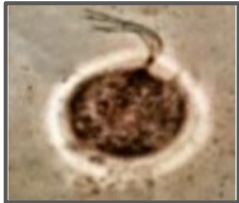
## General information

- *Trichomonas vaginitis* is caused by the sexually transmitted, *Trichomonas vaginalis*.
- In our region it is NOT that common.
- Survive in Swimming pool & hot tub.
- **Association with PID and Endometritis.**
- Facilitate HIV transmission.
- Woman with *Trichomonas Vaginitis* **should also be screen for other STIs.** "N.gonorrhoeae, Chlamydia ( *C.trachomatis* ), HIV, Syphilis".

## Organisms

- *Trichomoniasis vaginalis* is a **flagellated pear-shaped protozoan** (*T. vaginalis*) that can reside asymptotically in male seminal fluid.

## Clinical Features

Examination	
History:	specimen:
<ul style="list-style-type: none"><li>• Vaginal frothy &amp; green discharge discharge.</li><li>• Strawberry cervix (<b>cervical erythema</b>).</li><li>• The epithelium is frequently edematous and inflamed</li><li>• Bleed easily with manipulation</li></ul> 	<ul style="list-style-type: none"><li>• pH test</li><li>• Wet mount with saline prep.</li><li>• Culture : If wet mount is inclusive</li><li>• <b>NAAT (Nucleic Acid Amplification Testing)</b></li></ul> 

## Management

- **Oral metronidazole** (drug of choice) or **tinidazole** for **both the patient and her sexual partner.**
- Vaginal metronidazole gel has a 50% failure rate.

# Candida Vaginitis

## General information

- An estimated 75% of women will experience at least one episode of vulvovaginal candidiasis (VVC) during their lifetimes.
- Not sexually transmitted
- **Can be seen in non sexually active patients.**
- A hypersensitivity phenomenon may be responsible for the irritative symptoms associated with vulvovaginal candidiasis, especially for patients with chronic, recurrent disease.

## Organisms

- **Candida albicans 90%**
- Candida glabrata
- Candida tropicalis

## Risk Factors

DM

State of increase estrogen:  
Pregnancy, obesity or Oral  
contraceptive

Antibiotic

Decreased immunity  
(HIV, on steroid)

Anything **keeps vagina moist & warm**; Tight clothes or habitual use of pantiliner

## Clinical Features

### Examination

#### History:

- Crudy & white discharge.
- **Itching, burning**, and pain with intercourse
- Usually odorless
- The epithelium is frequently edematous and inflamed

#### specimen:

- pH test
- Wet mount ( it is often helpful to add some potassium hydroxide to the slide to better visualized the yeast )
- Yeast culture : +ve



## Management

- **Vaginal imidazole cream: miconazole**, terconazole, or clotrimazole
- **Or single oral dose of fluconazole**
- An asymptomatic sexual partner does not need to be treated.

# Common benign vulvar conditions

## Anatomy Review

- **Vulva VS Vagina** includes:
  - Vulva " outside" : Labia majora, labia minora, Vestibule and perineum.
  - Vagina " inside".

## Itching

- Many patients presenting with vaginitis symptoms will also have associated vulvar itching complaining.
- Many patients assume that itching = yeast but this is definitely not the case.
- Report of 200 new patients to a vulvar specialty clinic, the etiology of itching vulva was:
  - Contact dermatitis 20%
  - Recurrent yeast 20%
  - Lichen sclerosus/ Lichen simplex 11%
  - Bacterial vaginosis 7%
  - Vulvar vestibulitis 13%
  - Atrophic vaginitis 13%

## Common vulvar irritants

### Causes

- Shampoo and body washes.
- Creative underwear; 100% cotton is the best.
- Maxi pads and pantliners.

### Itch/scratch cycle

- If the itching not getting better with topical steroid or seems to not make sense then a biopsy should be performed.

### Biopsy

- Evaluate for dysplasia and cancer and can also diagnose benign vulvar conditions.

# Common benign vulvar conditions

- If a pt comes with itching after treatment, you should think for other differential diagnosis such as Lichenoid vulvar disease (lichen sclerosis, lichen planus, and lichen simplex.).
  - Which is a chronic inflammatory skin disease, can cause irritant of skin (dermis).

	Lichen sclerosis / LS	Lichen planus / LP	Lichen simplex chronicus
Definition	Benign chronic dermatological condition primarily affects the vulvar and perianal area and <b>sparing the vagina</b>	Rare inflammatory skin condition ( <u>autoimmune process</u> ) that can affect the skin, oral cavity, vulva and <b>vagina</b> .	secondary skin lesions as a result of chronic scratching (occur with Itch/scratch cycle)
Histo-pathology	Marked inflammation and Distinct dermal changes : <b>Epithelial thinning</b> with <u>Hyperkeratosis</u> and/or dermal fibrosis and sclerosis	Histological features that can differentiate LP from LS include a <b>irregular epidermal hyperplasia</b> forming saw-tooth appearance with wedge-shaped hypergranulosis, numerous cytoid bodies, and pointed rete ridges	<u>hyperplasia</u> and hyperkeratosis of squamous <u>epithelium</u>
Signs and symptoms	<b>vulvar burning and Itching</b> There are conditions that cause whitening of the vulvar epithelium		
	-A <b>wrinkled or cigarette paper</b> -like appearance of skin is characteristic - obliteration of the L.minora.	- vulva is often surrounded by <b>reticulate white striae (Wickham striae)</b> that appear as classic fernlike or lacy patterns. -Profuse vaginal discharge -Insertional dyspareunia / painful intercourse	Contact dermatitis : Erythema of labia majora
Treatment	<b>Topical corticosteroids</b>		
Notes	Lichen Sclerosis is benign in itself, but it will <b>increased risk of squamous cell carcinoma of the vulva</b>	Note that lichen planus can affect both vulva and vagina whereas lichen sclerosis can affect only vulva.	Counseling on how to avoid skin irritants and important of breaking the itch/scratch cycle.  <b>Itch/scratch cycle:</b> With <b>scratching</b> there is <b>mechanical irritation</b> which lead to <b>epidermal thickening and inflammatory cell infiltrate</b> which make skin itchier (that the cycle).

# Teaching case

A 20 year-old female college student comes to see you because of a persistent vaginal discharge. She is also interested in discussing contraceptive options. She and her boyfriend have been sexually active for 6 months. They use condoms "most of the time," but she is interested in using something with a lower failure rate for birth control. She has regular menses and no significant past medical or gynecologic history. She describes her vaginal discharge as yellowish and also notes mild vulvar irritation. On physical exam, she has normal external female genitalia without lesions or erythema, a gray/yellow discharge on the vaginal walls and pooled in the posterior fornix. Her cervix is grossly normal but bleeds easily with manipulation. The bimanual exam is unremarkable

## Q1- What is your differential diagnosis?

- **1st** : Trichomoniasis (*Trichomonas vaginalis*).
- Bacterial Vaginosis
- Gonorrhea\*
- Chlamydia\*
- Candidiasis. (No itchiness → **Candida should be ruled out.**)

**Both STD organisms are considered since they mentioned she's sexually active**

## Q2- What tests are currently available to help in the diagnosis of these disorders?

<b>Wet mount</b>	White blood cells that show an infection, or clue cells that show bacterial vaginosis, it's done in the clinic and it's a bedside test. What is the % of clue cells that must be seen on the slide to diagnose with BV? 20% (MCQ)
<b>Vaginal PH</b>	You should know how its done, either by PH strips or you add liquid to detect if it's alkali or acidic "avoid contamination with blood or semen; it could give false result' .
<b>Whiff test</b>	Performed by adding several drops of 10% potassium hydroxide to a sample of vaginal discharge. A <b>strong fishy odor</b> is indicative of a positive test result. <b>Positive for bacterial vaginosis; caused by gardnerella vaginalis.</b>
<b>Vaginal Culture</b>	<b>439:</b> The most important test. <b>441:</b> Vaginal culture is not a good method, not sensitive.
<b>PCR Tests</b>	Are available for gonorrhea, chlamydia, candida, and trichomoniasis. <b>Cervical canal or urine swap.</b>
<b>Rapid tests for enzyme activity</b>	For bacterial vaginosis, trichomoniasis and candida are available.
<b>DNA or Antigens testing</b>	Is available for trichomoniasis, gonorrhea and chlamydia.
<b>Vaginal Gram stain</b>	For Nugent Scoring of the bacterial flora can be helpful in identifying bacterial vaginosis (this scoring system assigns a value to different bacterial morphotypes seen on Gram stain of vaginal secretions).



# Teaching case

## Q3- What test findings would suggest trichomoniasis?

- Vaginal pH greater than 4.5.
- **Flagellated motile trichomonas on saline microscopy.** Most important is wet mount.
- Positive vaginal culture.
- OSOM Trichomonas Rapid Test (tests for trichomonas antigens).

## Q4- What two findings can be used to diagnose vulvovaginal candidiasis?

- Blastospores and **pseudohyphae** on saline or KOH wet mount.
- Positive vaginal culture.
- PH: More acidic (<3.8)

Usually we treat the patient empirically based on the description of her discharge; itching and white pieces indicates candidiasis, and we give antifungal and it has 3 types either by vaginal suppository , vaginal cream or oral pills .

## Q5- What are Amsel's Criteria for the diagnosis of Bacterial Vaginosis?

Amsel's Criteria is a scoring system. More suggestive of BV.

- Abnormal **gray** vaginal discharge.
- Vaginal **pH >4.5.**
- Positive amine test = **Fishy odor.**
- More than 20% of epithelial cells are **clue cells.**

The usual complaint of bacterial vaginosis is: discharge and a fishy odor especially after sexual intercourse due to combination with semen in the vagina. And we treat it with metronidazole or clindamycin either oral pills or vaginal cream.

## Q6- The patient is diagnosed with trichomoniasis. What is your treatment plan for this patient?

- Treatment with a 2 gram single **oral** dose of **metronidazole** or 500 mg oral metronidazole twice daily for 7 days; an alternate treatment can be Tinidazole 2g single oral dose. *We don't use gel as it doesn't reach the therapeutic level.*
- Sexual partner must be treated simultaneously and **treatment of both partners** should be completed before resumption of sexual activity.
- **Side effects of metronidazole treatment;** including a disulfiram-like reaction (drowsiness, headache, and a metallic or garlic taste in the mouth). Should be discussed with the patient and patient should be encouraged to abstain from alcohol during and for 24 hours after treatment with metronidazole.

# Teaching case

Q7- What are the additional reproductive health issues you would want to discuss with this patient?

- STI protection.
- Test the partner.
- Contraception:

Although this patient desires a contraceptive method that has a higher efficacy rate than condoms, you should discuss the need for condom use for protection from STIs. Condoms can prevent most of the STIs but not all of them; herpes can't be prevented with condoms, OCP reduce PID incidence but not STIs.

Q8- Would you recommend screening for additional sexually transmitted infections in this patient and if so, how?

- Yes, with serologic testing for hepatitis B, syphilis, HIV and cervical cultures for gonorrhea and chlamydia. If it's trichomonas vaginalis.

## Summary

### Speculum Exam:

Saline prep  
KOH prep

Fishy  
odor  
pH >4.5

#### Bacterial Vaginosis

#1 in US: anaerobes > lactobacillus

Discharge: thin, gray, + whiff test

Wet Mount: no WBC, yeast but + "clue" cells

Rx: Metronidazole or clindamycin (not STD)

Itching  
Burning  
pH >4.5

#### Trichomonas Vaginitis

#1 in world protozoa, STD

Discharge: frothy & green, "strawberry cervix"

Wet Mount: WBC & motile trichomonads (saline)

Rx: Metronidazole (treat sex partner)

Itching  
Burning  
pH <4.5

#### Yeast Vaginitis

#2 in US: Candida species common, not STD

Discharge: "cottage cheese"

Wet Mount: WBC (saline) hyphae (KOH)

Rx: PO fluconazole or "azole" creams (not STD)

# Doctor's Notes 441

- Normal vaginal PH is 3.5 - 4.5. Any alteration in PH either acidic or alkali can lead to an infection.
- The predominant normal flora of vagina is lactobacilli
- Douching is a very common practice in our culture, especially in newly married women. We discourage using it as it can lead to bleeding.
- **Bleed easily with manipulation?**  
goes more with Trichomonas vaginalis.
- **No itchiness** —> Candida should be **ruled out**.
- **Any condition can lead to immunocompromised it is a risk factor for ?**  
candida vaginitis
- **If a patient come to your clinic with itching, discharge, and redness. What is your differential diagnosis other than infection ?**  
Dermatitis
- **Condoms** help to **reduce the risk** of STD/STI especially with **chlamydia & gonorrhea**.
- **What is the only STD/STI that is NOT prevented by condoms?**  
Herpes.
- **What is the most effective contraceptive method?**  
Abstinence.
- **What is the most effective contraceptive method for married women?**  
IUD + Sterilization method (tubal ligation, Salpingectomy, Salpingieotomy)
  - **Why not oral?** Because of compliance issues.

# Reference

than 4.5, which is maintained by the production of lactic acid. Estrogen-stimulated vaginal epithelial cells are rich in glycogen. Vaginal epithelial cells break down glycogen to monosaccharides, which can be converted by the cells themselves, and by lactobacilli to lactic acid. Normal vaginal secretions are floccular in consistency, white in color, and usually located in the dependent portion of the vagina (posterior fornix).

**Vaginal secretions can be analyzed by a wet-mount preparation.** A sample of vaginal secretions is suspended in 0.5 mL of normal saline in a tube, transferred to a slide, covered with a slip, and assessed by microscopy. Microscopy of normal vaginal secretions reveals many superficial epithelial cells, few white blood cells (less than 1 per epithelial cell), and few, if any, clue cells. **Clue cells are superficial vaginal epithelial cells with adherent bacteria, usually *Gardnerella vaginalis*, which obliterate the crisp cell border when visualized microscopically (Figure 22-1).** Potassium hydroxide (KOH) 10% may be added to the slide or a separate preparation can be made to examine the secretions for evidence of fungal elements. **Gram stain reveals normal superficial epithelial cells and a predominance of gram-positive rods (lactobacilli).**

## Vaginal Infections

### BACTERIAL VAGINOSIS

Bacterial vaginosis (BV) is an alteration of normal vaginal bacterial flora that results in the loss of hydrogen peroxide-producing lactobacilli and an overgrowth of predominantly anaerobic bacteria. Anaerobic bacteria can be found in less than 1% of the flora of normal women. **In women with BV, the concentration of anaerobes, and *G. vaginalis* and *Mycoplasma hominis*, is 100 to 1000 times higher than in normal women.**

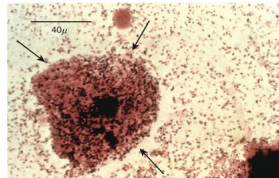


FIGURE 22-1 Wet mount microscopy of vaginal secretions from a patient with bacterial vaginosis. Note the presence of a clue cell, which is an epithelial cell with "serrated" edges caused by bacteria (arrows).

Lactobacilli are usually absent. **Women with BV are at increased risk for pelvic inflammatory disease (PID), postabortal PID, postoperative cuff infections after hysterectomy, and abnormal cervical cytology.** Pregnant women with BV are at risk for premature rupture of the membranes, preterm labor and delivery, chorioamnionitis, and postcesarean endometritis.

Office-based testing is required to diagnose BV. Figure 22-1 reveals a microscopy of a clue cell. The addition of potassium hydroxide to the vaginal secretions (the "whiff" test) releases a fishy, amine-like odor. Clinicians who are unable to perform microscopy can use alternative diagnostic tests such as a pH and amines test card, detection of *G. vaginalis* ribosomal RNA, or Gram stain. Culture of *G. vaginalis* is not recommended as a diagnostic tool because of its lack of specificity.

Ideally, treatment of BV should inhibit anaerobes but not vaginal lactobacilli. **Metronidazole**, an antibiotic with excellent activity against anaerobes but poor activity against lactobacilli, **is the drug of choice for the treatment of BV.** Clindamycin is an alternative agent. Table 22-1 illustrates the 2015 Centers for Disease Control and Prevention (CDC) guidelines for the treatment of bacterial vaginosis. Table 22-2 has alternative regimens for the treatment of bacterial vaginosis. Many clinicians prefer intravaginal treatment to avoid systemic side effects such as mild to moderate gastrointestinal upset and an unpleasant taste. **Treatment of the male sexual partner does not improve therapeutic response and therefore is not recommended.**

### TRICHOMONAS VAGINITIS

Trichomonas vaginitis is caused by the sexually transmitted, flagellated parasite, *Trichomonas vaginalis*.

#### TABLE 22-1 2015 CENTERS FOR DISEASE CONTROL (CDC) RECOMMENDED FIRST-LINE REGIMEN FOR BACTERIAL VAGINOSIS

- Metronidazole** 500 mg orally twice a day for 7 days\*
- OR
- Metronidazole gel** 0.75%, one full applicator (5 g) intravaginally, once a day for 5 days
- OR
- Clindamycin cream** 2%, one full applicator (5 g) intravaginally at bedtime for 7 days†

From Diseases Characterized by Vaginal Discharge: Sexually Transmitted Diseases Treatment Guidelines, 2015. <http://www.cdc.gov/std/treatment/2015/vaginal-discharge.htm>. Accessed February 19, 2015.

\*Consuming alcohol should be avoided during treatment and for 24 hours thereafter.  
†Clindamycin cream is oil-based and might weaken latex condoms and diaphragms for 5 days after use (refer to clindamycin product labeling for additional information).

#### TABLE 22-2 2015 CENTERS FOR DISEASE CONTROL (CDC) RECOMMENDED ALTERNATIVE REGIMEN FOR BACTERIAL VAGINOSIS

- Tindazole** 2 gm orally once daily for 2 days
- OR
- Tindazole** 1 g orally once daily for 5 days
- OR
- Clindamycin** 300 mg orally twice daily for 7 days
- OR
- Clindamycin ovules** 100 mg intravaginally once at bedtime for 3 days

From Diseases Characterized by Vaginal Discharge: Sexually Transmitted Diseases Treatment Guidelines, 2015. <http://www.cdc.gov/std/treatment/2015/vaginal-discharge.htm>. Accessed February 19, 2015.

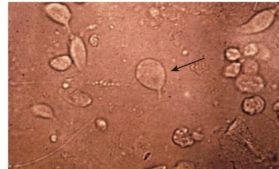


FIGURE 22-2 Microscopic view (high power) of a trichomonad (arrow) in a saline wet-mount preparation. The organisms are usually motile in this type of preparation.

The transmission rate is high: **70% of men contract the disease after a single exposure to an infected woman**, which suggests that the rate of male-to-female transmission is even higher. The parasite, which exists only in trophozoite form, has the ability to generate hydrogen to combine with oxygen to create an anaerobic environment. **Bacterial vaginosis can be diagnosed in as many as 60% of patients with trichomonas vaginitis.**

**Trichomonas vaginitis is associated with a profuse, purulent, malodorous vaginal discharge that may be accompanied by vulvar pruritus.** In patients with high concentrations of organisms, a patchy vaginal erythema and colpitis macularis ("strawberry" cervix) may be observed. Microscopy of the secretions may reveal **motile trichomonads (Figure 22-2)** and increased numbers of leukocytes, but the sensitivity of this test is

poor (50%). For this reason, nucleic acid amplification testing is recommended when trichomoniasis is suspected but not confirmed by microscopy.

Because of the sexually transmitted nature of trichomonas vaginitis, women with this infection should be tested for other STIs, particularly *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. Serologic testing for syphilis and human immunodeficiency virus (HIV) infection should be considered.

**Metronidazole is the drug of choice for infection of vaginal trichomoniasis.** Both a single-dose (2 g orally) and a multidose (500 mg twice daily for 7 days) regimen are highly effective and have cure rates of about 55%. **The sexual partner should be treated.**

Women who do not respond to initial therapy should be treated again with metronidazole, 500 mg twice daily for 7 days. If repeated treatment is not effective, the patient should be treated with a single 2-g dose of metronidazole once daily for 5 days or tinidazole 2 g, in a single dose for 5 days. Patients who do not respond to repeated treatment with metronidazole or tinidazole and for whom the possibility of reinfection is excluded should be referred for expert consultation. In these uncommon refractory cases, an important part of management is to obtain cultures of the parasite to determine its susceptibility to metronidazole and tinidazole.

### VULVOVAGINAL CANDIDIASIS

**An estimated 75% of women will experience at least one episode of vulvovaginal candidiasis (VVC) during their lifetimes.** Nearly 45% of women will experience two or more episodes. A few are plagued with a chronic, recurrent infection. *Candida albicans* is responsible for 85-90% of vaginal yeast infections. The extensive areas of pruritus and inflammation, often associated with minimal invasion of the lower genital tract epithelial cells, suggest that an extracellular toxin or enzyme may play a role in the pathogenesis of this disease. A **hypersensitivity phenomenon may be responsible for the irritative symptoms associated with VVC**, especially for patients with chronic, recurrent disease.

**Factors that predispose women to the development of symptomatic VVC include antibiotic use, pregnancy, and diabetes.** Pregnancy and diabetes are associated with a qualitative decrease in cell-mediated immunity, leading to a higher incidence of candidiasis.

**The symptoms of VVC consist of vulvar pruritus associated with a discharge that can vary from watery to homogeneously thick.** Vaginal soreness, dyspareunia, vulvar burning, and irritation may be present. Examination may reveal erythema and edema of the labia and vulvar skin. Discrete pustulopapular peripheral lesions may be present. **The vagina may be erythematous with an adherent, whitish discharge.** The cervix appears normal. Fungal elements, either budding

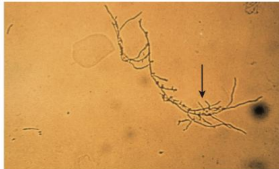


FIGURE 22-3 Mycelial tangles of yeast (arrow) pseudohyphae in potassium hydroxide wet-mount preparation.

yeast forms or mycelia, appear in as many as 80% of cases (Figure 22-3).

### Treatment

The treatment of VVC involves the use of topically applied azole drugs, which are more effective than nystatin. Table 22-3 illustrates the 2010 CDC guidelines for the treatment of VVC. **Treatment with azoles results in relief of symptoms and negative cultures in 80-90% of patients.** Symptoms usually resolve in 2 to 3 days. Short-course regimens up to 3 days are recommended. **The oral antifungal agent, fluconazole, used in a single 150-mg dose, is also recommended for the treatment of VVC.** It has equal efficacy when compared with topical azoles in the treatment of mild to moderate VVC. Symptoms will persist for 2 to 3 days. Adjuvant treatment with a weak topical steroid, such as 1% hydrocortisone cream, may be helpful in relieving some of the external irritation.

### RECURRENT VULVOVAGINAL CANDIDIASIS

A small number of women develop recurrent VVC (RVVC), defined as four or more episodes in a year. **The treatment of patients with RVVC consists of inducing a remission of chronic symptoms with fluconazole (150 mg every 3 days for three doses), then maintaining a suppressive dose of this agent (fluconazole, 150 mg weekly) for 6 months.** On this regimen, 90% of women with RVVC will remain in remission. After suppressive therapy, approximately half will remain asymptomatic. Recurrence will occur in the other half and should prompt reinstitution of suppressive therapy.

### ATROPHIC VAGINITIS

Estrogen plays an important role in the maintenance of normal vaginal ecology. **Hypoestrogenic women having undergone natural or surgical menopause may have dyspareunia and postcoital bleeding result-**

#### TABLE 22-3 2015 CENTERS FOR DISEASE CONTROL (CDC) RECOMMENDED FIRST-LINE REGIMEN FOR VULVOVAGINAL CANDIDIASIS

- Over-the-Counter Intravaginal Agents
- Clotrimazole** 1% cream 5 g intravaginally for 7-14 days
- OR
- Clotrimazole** 2% cream 5 g intravaginally for 3 days
- OR
- Miconazole** 2% cream 5 g intravaginally for 7 days
- OR
- Miconazole** 4% cream 5 g intravaginally for 3 days
- OR
- Miconazole** 100 mg vaginal suppository, one suppository for 7 days
- OR
- Miconazole** 200 mg vaginal suppository, one suppository for 3 days
- OR
- Miconazole** 1200 mg vaginal suppository, one suppository for 1 day
- OR
- Tioconazole** 6.5% ointment 5 g intravaginally in a single application
- Prescription Intravaginal Agents
- Butoconazole** 2% cream (single dose bioadhesive product), 5 g intravaginally for 1 day
- OR
- Terconazole** 0.4% cream 5 g intravaginally for 7 days
- OR
- Terconazole** 0.8% cream 5 g intravaginally for 3 days
- OR
- Terconazole** 80 mg vaginal suppository, one suppository for 3 days
- Oral Agent
- Fluconazole** 150 mg oral tablet, one tablet in single dose

From Diseases Characterized by Vaginal Discharge: Sexually Transmitted Diseases Treatment Guidelines, 2015. <http://www.cdc.gov/std/treatment/2015/vaginal-discharge.htm>. Accessed February 19, 2015.

**ing from atrophy of the vaginal and vulvar epithelium.** Examination reveals atrophy of the external genitalia, along with a loss of the vaginal rugae. The vaginal epithelium may be somewhat friable in areas. Microscopy of the vaginal secretions shows a predominance of parabasal epithelial cells and an increased number of leukocytes.

**Atrophic vaginitis is treated with vaginal estrogen cream.** Maintenance estrogen therapy, either topical or systemic, should be considered to prevent recurrence of this disorder.



## Med 441 Team:

### Leaders:

Leen Alrajhi - Yara Almufleh

### Members:

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# Good Luck!



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