

Slide 1

Vaginitis

- Bacterial Vaginosis (BV)
- Vulvovaginal Candidiasis (VVC)
- Trichomoniasis

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Vaginitis Curriculum

Vaginal Environment

- The vagina is a dynamic ecosystem that contains approximately 10^9 bacterial colony-forming units.
- Normal vaginal discharge is clear to white, odorless, and of high viscosity.
- Normal bacterial flora is dominated by lactobacilli – other potential pathogens present.
- Lactic acid helps to maintain a normal vaginal pH of 3.8 to 4.2.
- Acidic environment and other host immune factors inhibits the overgrowth of bacteria.
- Some lactobacilli also produce H_2O_2 , a potent microbicide.

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Vaginitis Curriculum

Vaginitis

- Usually characterized by
 - Vaginal discharge
 - Vulvar itching
 - Irritation
 - Odor
- Common types
 - Bacterial vaginosis (40%–45%)
 - Vulvovaginal candidiasis (20%–25%)
 - Trichomoniasis (15%–20%)

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Vaginitis Curriculum

Other Causes of Vaginitis

- Normal physiologic variation
- Allergic reactions
- Herpes simplex virus
- Mucopurulent cervicitis
- Atrophic vaginitis
- Vulvar vestibulitis
- Foreign bodies
- Desquamative inflammatory vaginitis

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Vaginitis Curriculum

Diagnosis of Vaginitis

- Patient history
- Visual inspection of internal/external genitalia
- Appearance of discharge

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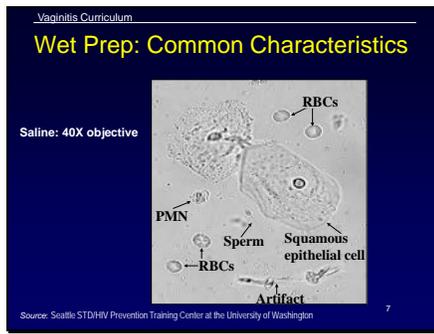
Vaginitis Curriculum

Preparation and Evaluation of Specimen

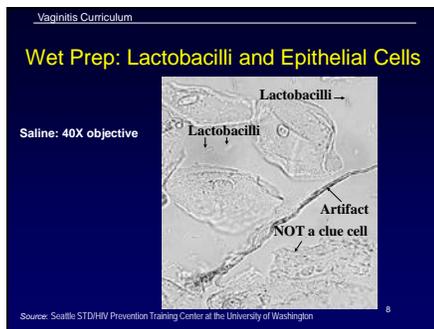
- Collection of specimen
- Preparation of specimen slide
- Examination of specimen slide
 - NaCl (wet mount)
 - KOH (wet mount)
- Whiff test
- Vaginal pH

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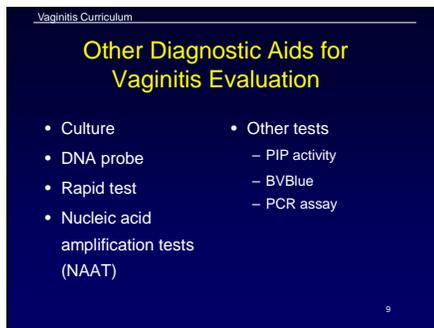
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Bacterial Vaginosis Curriculum

Lessons

- I. Epidemiology: Disease in the U.S.
- II. Pathogenesis
- III. Clinical manifestations
- IV. Diagnosis
- V. Patient management
- VI. Prevention

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Bacterial Vaginosis Curriculum

Lesson I: Epidemiology: Disease in the U.S.

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Bacterial Vaginosis Curriculum Epidemiology

Epidemiology

- Most common cause of vaginitis
- Prevalence varies by population
 - 5%–25% among college students
 - 12%–61% among STD patients
- Widely distributed

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Bacterial Vaginosis Curriculum

Lesson II: Pathogenesis

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Bacterial Vaginosis Curriculum Pathogenesis

Microbiology

- Overgrowth of bacteria species normally present in vagina with anaerobic bacteria
- BV correlates with a decrease or loss of protective lactobacilli
 - Vaginal acid pH normally maintained by lactobacilli through metabolism of glycogen.
 - Hydrogen peroxide (H_2O_2) is produced by some *Lactobacilli*, sp.
 - H_2O_2 helps maintain a low pH, which inhibits bacteria overgrowth.
 - Loss of protective lactobacilli may lead to BV.

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Bacterial Vaginosis Curriculum Pathogenesis

H_2O_2 -Producing Lactobacilli

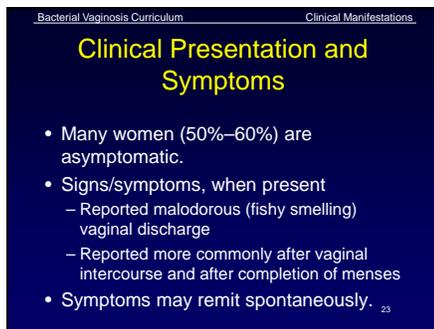
- All lactobacilli produce lactic acid.
- Some species also produce H_2O_2 .
- H_2O_2 is a potent natural microbicide.
- Present in 42%–74% of females.
- In vitro, H_2O_2 is toxic to viruses such as HIV, as well as bacteria.

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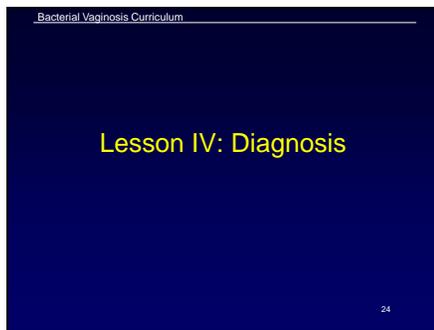
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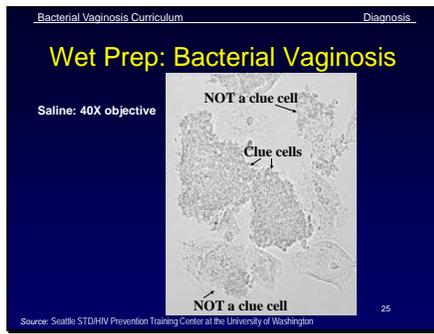
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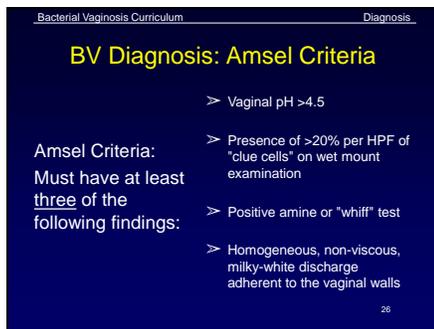
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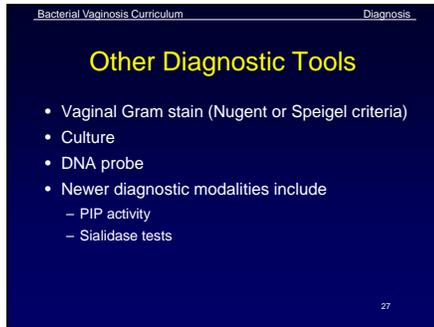
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Bacterial Vaginosis Curriculum

Lesson V: Patient Management

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Bacterial Vaginosis Curriculum Management

Treatment

CDC-recommended regimens

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

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Bacterial Vaginosis Curriculum Management

Treatment (continued)

Alternative regimens (nonpregnant)

- Tinidazole 2 g orally once daily for 2 days, *or*
- Tinidazole 1 g orally once daily for 5 days, *or*
- Clindamycin 300 mg orally twice a day for 7 days, *or*
- Clindamycin ovules 100 g intravaginally once at bedtime for 3 days

Multiple recurrences

- Twice weekly metronidazole gel for 4–6 months may reduce recurrences
- Oral nitroimidazole followed by intravaginal boric acid and suppressive metronidazole gel

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Bacterial Vaginosis Curriculum Management

Recurrence

- Recurrence rate is 20% to 40% one month after therapy.
- Recurrence may be a result of persistence of BV-associated organisms and a failure of lactobacillus flora to recolonize.
- Data do not support yogurt therapy or exogenous oral lactobacillus treatment.
- Under study: vaginal suppositories containing human lactobacillus strains.
- Twice weekly metronidazole gel for 4–6 months may reduce recurrences.
- Limited data suggest that oral nitroimidazole followed by intravaginal boric acid and suppressive metronidazole gel might be a treatment option after multiple occurrences.

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Bacterial Vaginosis Curriculum

Lesson VI: Prevention

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Bacterial Vaginosis Curriculum Prevention

Partner Management

- Relapse or recurrence is not affected by treatment of sex partner(s).
- Routine treatment of sex partners is not recommended.

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Bacterial Vaginosis Curriculum Prevention

Patient Counseling and Education

- Nature of the disease
 - Normal vs. abnormal discharge, malodor, BV signs and symptoms
- Transmission issues
 - Association with sexual activity, high concordance in female same-sex partnerships
- Risk reduction
 - Correct and consistent condom use
 - Avoid douching
 - Limit number of sex partners

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Candidiasis Curriculum

Vaginitis

Vulvovaginal Candidiasis (VVC)



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Candidiasis Curriculum

Learning Objectives

Upon completion of this content, the learner will be able to:

- Describe the epidemiology of candidiasis in the U.S.
- Describe the pathogenesis of candidiasis.
- Describe the clinical manifestations of candidiasis.
- Identify common methods used in the diagnosis of candidiasis.
- List CDC-recommended treatment regimens for candidiasis.
- Describe patient follow-up and partner management for candidiasis.
- Summarize appropriate prevention counseling messages for patients with candidiasis.

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Candidiasis Curriculum

Lessons

- I. Epidemiology: Disease in the U.S.
- II. Pathogenesis
- III. Clinical manifestations
- IV. Diagnosis
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- VI. Prevention

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Candidiasis Curriculum

Lesson I: Epidemiology: Disease in the U.S.

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Candidiasis Curriculum Epidemiology

VVC Epidemiology

- Affects most females during lifetime, with approximately 50% having two or more episodes
- Most cases caused by *C. albicans* (85%–90%)
- Second most common cause of vaginitis
- Estimated cost: \$1 billion annually in the U.S.

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Candidiasis Curriculum Epidemiology

Transmission

- Candida species are normal flora of skin and vagina and are not considered to be sexually transmitted pathogens.

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Candidiasis Curriculum

Lesson II: Pathogenesis

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Candidiasis Curriculum Pathogenesis

Microbiology

- Candida species are normal flora of the skin and vagina.
- VVC is caused by overgrowth of *C. albicans* and other non-albicans species.
- Yeast grows as oval budding yeast cells or as a chain of cells (pseudohyphae).
- Symptomatic clinical infection occurs with excessive growth of yeast.
- Disruption of normal vaginal ecology or host immunity can predispose to vaginal yeast infections.

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Candidiasis Curriculum

Lesson III: Clinical Manifestations

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Candidiasis Curriculum Clinical Manifestations

Clinical Presentation and Symptoms

- Vulvar pruritis is most common symptom.
- Thick, white, curdy vaginal discharge ("cottage cheese-like")
- Erythema, irritation, occasional erythematous "satellite" lesion
- External dysuria and dyspareunia

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Candidiasis Curriculum Clinical Manifestations

Vulvovaginal Candidiasis



Source: Health Canada, Sexual Health and STI Section, Clinical Slide Gallery

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Candidiasis Curriculum

Lesson IV: Candidiasis Diagnosis

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Candidiasis Curriculum

Diagnosis

- History, signs and symptoms
- Visualization of pseudohyphae (mycelia) and/or budding yeast (conidia) on KOH or saline wet prep
- pH normal (4.0 to 4.5)
 - If pH > 4.5, consider concurrent BV or trichomoniasis infection
- Cultures not useful for routine diagnosis

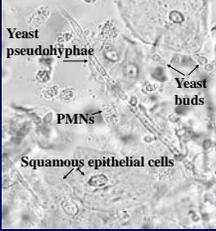
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Candidiasis Curriculum

PMNs and Yeast Pseudohyphae

Saline: 40X objective



Yeast pseudohyphae

Yeast buds

PMNs

Squamous epithelial cells

Source: Seattle STD/HIV Prevention Training Center at the University of Washington

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Candidiasis Curriculum Management

Complicated VVC

- Recurrent (RVVC)
 - Four or more episodes in one year
- Severe
 - Edema
 - Excoriation/fissure formation
- Non-albicans candidiasis
- Compromised host

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Candidiasis Curriculum Management

Complicated VVC Treatment

- Recurrent VVC (RVVC)
 - 7–14 days of topical therapy, or
 - 100 mg, 150 mg, or 200 mg oral dose of fluconazole repeated every 3 days (days 1, 4, and 7)
 - Maintenance regimens (see 2010 CDC STD treatment guidelines)
- Severe VVC
 - 7–14 days of topical therapy, or
 - 150 mg oral dose of fluconazole repeated in 72 hours

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Candidiasis Curriculum Management

Complicated VVC Treatment (continued)

- Non-albicans
 - Optimal treatment unknown
 - 7–14 days non-fluconazole therapy
 - 600 mg boric acid in gelatin capsule vaginally once a day for 14 days for recurrences
- Compromised host
 - 7–14 days of topical therapy
- Pregnancy
 - Fluconazole is contraindicated
 - 7-day topical agents are recommended

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Candidiasis Curriculum

Lesson VI: Prevention

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Candidiasis Curriculum Prevention

Partner Management

- VVC is not usually acquired through sexual intercourse.
- Treatment of sex partners is not recommended.
- A minority of male sex partners may have balanitis and may benefit from treatment with topical antifungal agents to relieve symptoms.

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Candidiasis Curriculum Prevention

Patient Counseling and Education

- Nature of the disease
 - Normal vs. abnormal vaginal discharge, signs and symptoms of candidiasis, maintain normal vaginal flora
- Transmission Issues
 - Not sexually transmitted
- Risk reduction
 - Avoid douching, avoid unnecessary antibiotic use, complete course of treatment

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Trichomoniasis Curriculum

Vaginitis

Trichomonas vaginalis



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Trichomoniasis Curriculum

Learning Objectives

Upon completion of this content, the learner will be able to:

- Describe the epidemiology of trichomoniasis in the United States.
- Describe the pathogenesis of *T. vaginalis*.
- Describe the clinical manifestations of trichomoniasis.
- Identify common methods used in the diagnosis of trichomoniasis.
- List CDC-recommended treatment regimens for trichomoniasis.
- Describe patient follow up and partner management for trichomoniasis.
- Describe appropriate prevention counseling messages for patients with trichomoniasis.

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Trichomoniasis Curriculum

Lessons

- I. Epidemiology: Disease in the U.S.
- II. Pathogenesis
- III. Clinical manifestations
- IV. Diagnosis
- V. Patient management
- VI. Prevention

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Trichomoniasis Curriculum

Lesson I: Epidemiology: Disease in the U.S.

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Trichomoniasis Curriculum Epidemiology

Incidence and Prevalence

- Most prevalent nonviral STI
- Estimated one million cases annually in the U.S. at a medical cost of \$24 million
- Estimated prevalence:
 - 3% in the general female population
 - 1.3% in non-Hispanic white women
 - 1.8% in Mexican American women
 - 13.3% in non-Hispanic black women
 - 40%–60% in female prison inmates and commercial sex workers
 - 18%–50% in females with vaginal complaints

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Trichomoniasis and Other Vaginal Infections— Women—Initial Visits to Physicians' Offices, United States, 1966–2011

| Year | Other Vaginitis (thousands) | Trichomoniasis (thousands) |
|------|-----------------------------|----------------------------|
| 1966 | 1000 | 200 |
| 1971 | 1200 | 200 |
| 1976 | 1500 | 200 |
| 1981 | 1800 | 200 |
| 1986 | 2500 | 200 |
| 1991 | 4000 | 200 |
| 1996 | 3500 | 200 |
| 2001 | 3800 | 200 |
| 2006 | 3500 | 200 |
| 2011 | 3200 | 200 |

NOTE: The relative standard errors for trichomoniasis estimates range from 16% to 27% and for other vaginitis estimates range from 8% to 13%.
SOURCE: MS Health Integrated Promotional Services™, MS Health Report, 1966–2011.

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Trichomoniasis Curriculum Epidemiology

Risk Factors

- Multiple sexual partners
- Lower socioeconomic status
- History of STDs
- Lack of condom use

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Trichomoniasis Curriculum Epidemiology

Transmission

- Almost always sexually transmitted.
- Females and males may be asymptomatic.
- Transmission between female sex partners has been documented.

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Trichomoniasis Curriculum

Lesson II: Pathogenesis

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Trichomoniasis Curriculum Pathogenesis

Microbiology

- Etiologic agent
 - *Trichomonas vaginalis* is a single-celled, flagellated, anaerobic protozoan parasite.
 - Only protozoan that infects the genital tract.
- Associations with
 - Preterm rupture of membranes and pre-term delivery.
 - Increased risk of HIV acquisition and transmission.

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Trichomoniasis Curriculum Pathogenesis

Trichomonas vaginalis



Source: CDC, National Center for Infectious Diseases, Division of Parasitic Diseases

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Trichomoniasis Curriculum

Lesson III: Clinical Manifestations

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Trichomoniasis Curriculum

Lesson IV: Diagnosis

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Trichomoniasis Curriculum

Diagnosis in Females

- Motile trichomonads seen on saline wet mount
- Vaginal pH >4.5 often present
- Culture has been the "gold standard"
- Pap smear sensitivity with traditional cytology poor, but enhanced by use of liquid-based testing
- DNA probe
- Rapid test (antigen detection test, OSOM)
- NAAT (urine or vaginal swab)

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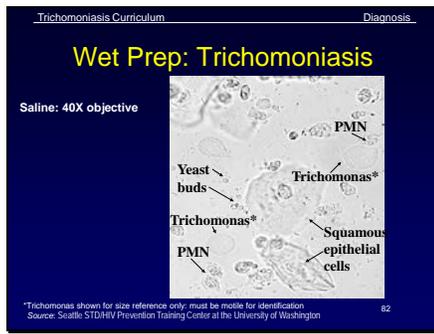
Trichomoniasis Curriculum

Diagnosis in Males

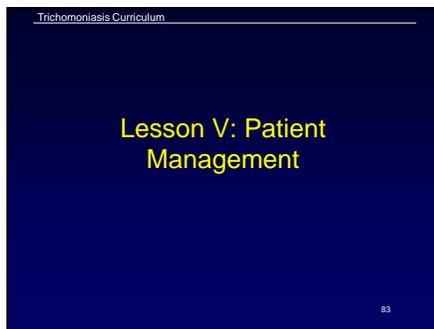
- Culture testing of urethral swab, urine, or semen NAATs
- Sex partners of women diagnosed with *T. vaginalis* should also be treated regardless of initial testing

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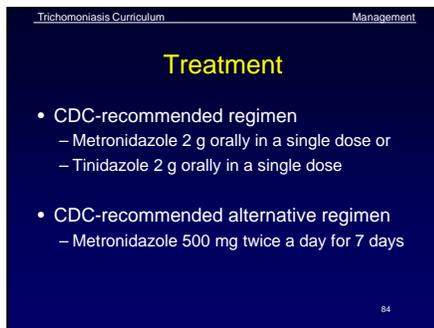
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Trichomoniasis Curriculum Management

Pregnancy

- CDC-recommended regimen
 - Metronidazole 2 g orally in a single dose
- All symptomatic pregnant women should be treated, regardless of pregnancy stage.

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Trichomoniasis Curriculum Management

Treatment Failure

- A common reason for treatment failure is reinfection. Therefore, it is critical to assure treatment of all sex partners at the same time.
- If treatment failure occurs with metronidazole 2 g orally in a single dose for all partners, treat with metronidazole 500 mg orally twice daily for 7 days or tinidazole 2 g orally single dose.
- If treatment failure of either of these regimens, consider retreatment with tinidazole or metronidazole 2 g orally once a day for 5 days.
- If repeated treatment failures occur, contact the Division of STD Prevention, CDC, for metronidazole-susceptibility testing (telephone: 404-718-4141, website: www.cdc.gov/std)

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Trichomoniasis Curriculum

Lesson VI: Prevention

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Trichomoniasis Curriculum Prevention

Partner Management

- Sex partners should be treated.
- Patients should be instructed to avoid sex until they and their sex partners are cured (when therapy has been completed and patient and partner(s) are asymptomatic, about 7 days).

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Trichomoniasis Curriculum Prevention

Patient Counseling and Education

- Nature of the disease
 - May be asymptomatic in both men and women, in women may persist for months to years, untreated trichomoniasis might be associated with adverse pregnancy outcomes, douching may worsen vaginal discharge, alcohol consumption is contraindicated with metronidazole
- Transmission issues
 - Almost always sexually transmitted, fomite transmission rare, might be associated with increased susceptibility to HIV acquisition

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Trichomoniasis Curriculum Prevention

Risk Reduction

The clinician should

- Assess patient's potential for behavior change.
- Discuss individualized risk-reduction plans with the patient.
- Discuss prevention strategies such as abstinence, monogamy, use of condoms, and limiting the number of sex partners.
- Latex condoms, when used consistently and correctly, can reduce the risk of transmission of the *T. vaginalis* parasite.

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Case Study

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Case Study



History

Tanya Walters

- 24-year-old single female
- Presents with complaints of a smelly, yellow vaginal discharge and slight dysuria for one week
- Denies vulvar itching, pelvic pain, or fever
- Two sex partners during the past year—did not use condoms with these partners—on oral contraceptives for birth control
- No history of sexually transmitted diseases, except for trichomoniasis one year ago
- Last check-up one year ago

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Case Study

Physical Exam

- Vital signs: blood pressure 112/78, pulse 72, respiration 15, temperature 37.3° C
- Cooperative, good historian
- Chest, heart, breast, musculoskeletal, and abdominal exams within normal limits
- No flank pain on percussion
- Normal external genitalia with a few excoriations near the introitus, but no other lesions
- Speculum exam reveals a moderate amount of frothy, yellowish, malodorous discharge, without visible cervical mucopus or easily induced cervical bleeding
- Bimanual examination was normal without uterine or adnexal tenderness

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Case Study

Questions

1. What is your differential diagnosis based on history and physical examination?
2. Based on the differential diagnosis of vaginitis, what is the etiology?
3. Which laboratory tests should be offered or performed?

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Case Study

Laboratory Results

- Vaginal pH - 6.0
- Saline wet mount of vaginal secretions -- numerous motile trichomonads and no clue cells
- KOH wet mount -- negative for budding yeast and pseudohyphae

4. What may one reasonably conclude about Tanya's diagnosis?
5. What is the appropriate CDC-recommended first-line treatment for this patient?

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Case Study

Partner Management

| | | | |
|---|--------------------------------------|---|---------------|
|  | Jamie |  | Calvin |
| • Last sexual contact: 2 days ago | • First sexual contact: 2 months ago | • Twice a week, vaginal sex | |
| • Last sexual contact: 6 months ago | • First sexual contact: 7 months ago | • 3 times a week, vaginal and oral sex | |

6. How should Jamie and Calvin be managed?

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Follow-Up

- Tanya was prescribed metronidazole 2 g orally, and was instructed to abstain from sexual intercourse until her current partner was treated.
 - She returned two weeks later. She reported taking her medication, but had persistent vaginal discharge that had not subsided with treatment. She reported abstinence since her clinic visit, and her partner had moved out of the area. Her tests for other STDs (including chlamydia and gonorrhea) were negative.
 - The vaginal wet mount again revealed motile trichomonads.
7. What is the appropriate therapy for Tanya now?
8. What are appropriate prevention and counseling messages for Tanya?
