

Slide 1

Vaginitis

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

1

Slide 2

Vaginitis Curriculum

Vaginal Environment

- The vagina is a dynamic ecosystem that contains approximately 10^8 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.

2

Slide 3

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%)

3

Slide 4

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

4

Slide 5

Vaginitis Curriculum

Diagnosis of Vaginitis

- Patient history
- Visual inspection of internal/external genitalia
- Appearance of discharge
- Collection of specimen
- Preparation and examination of specimen slide

5

Slide 6

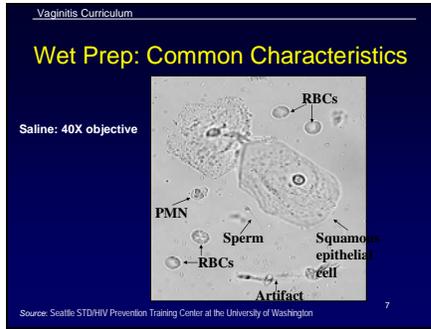
Vaginitis Curriculum

Preparation and Evaluation of Specimen

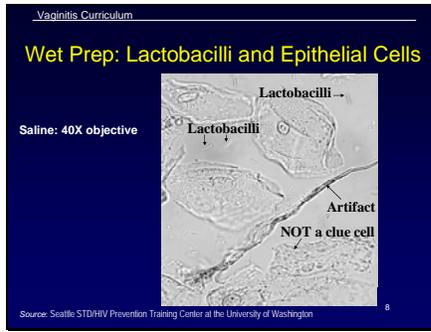
- Collection of specimen
- Preparation of specimen slide
- Examination of specimen slide
 - NaCl (wet mount)
 - KOH (wet mount)
- Whiff test
- Vaginal pH

6

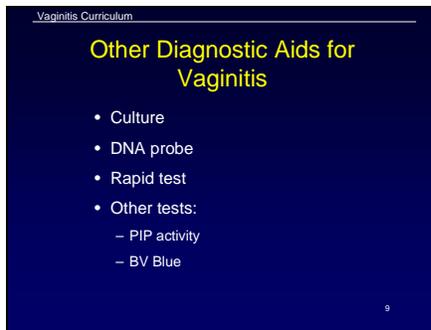
Slide 7



Slide 8



Slide 9



Slide 10

Vaginitis Curriculum

Vaginitis Differentiation

	Normal	Bacterial Vaginosis	Candidiasis	Trichomoniasis
Symptom presentation		Odor, discharge, itch	Itch, discomfort, dysuria, thick discharge	Itch, discharge, 50% asymptomatic
Vaginal discharge	Clear to white	Homogenous, adherent, thin, milky white, malodorous "fishy"	Thick, clumpy, white "cottage cheese"	Frothy, gray or yellow-green, malodorous
Clinical findings			Inflammation and erythema	Cervical petechiae "strawberry cervix"
Vaginal pH	3.8 - 4.2	> 4.5	Usually \leq 4.5	> 4.5
KOH "whiff" test	Negative	Positive	Negative	Often positive
NaCl wet mount	Lacto-bacilli	Clue cells (\geq 20%), no/few WBCs	Few WBCs	Motile flagellated protozoa, many WBCs
KOH wet mount			Pseudophyphae or spores if non-albicans species	10

Slide 11

Bacterial Vaginosis Curriculum

Vaginitis

Bacterial Vaginosis (BV)



11

Slide 12

Bacterial Vaginosis Curriculum

Learning Objectives

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

1. Describe the epidemiology of bacterial vaginosis in the U.S.
2. Describe the pathogenesis of bacterial vaginosis.
3. Describe the clinical manifestations of bacterial vaginosis.
4. Identify common methods used in the diagnosis of bacterial vaginosis.
5. List CDC-recommended treatment regimens for bacterial vaginosis.
6. Describe patient follow up and partner management for patients with bacterial vaginosis.
7. Summarize appropriate prevention counseling messages for patients with bacterial vaginosis.

12

Slide 13

Bacterial Vaginosis Curriculum

Lessons

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

13

Slide 14

Bacterial Vaginosis Curriculum

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

14

Slide 15

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

15

Slide 16

Bacterial Vaginosis Curriculum Epidemiology

Epidemiology (continued)

- Linked to :
 - premature rupture of membranes,
 - premature delivery and low birth-weight delivery,
 - acquisition of HIV,
 - development of PID, and
 - post-operative infections after gynecological procedures

16

Slide 17

Bacterial Vaginosis Curriculum Epidemiology

Risk Factors

- African Americans
- Two or more sex partners in previous six months/new sex partner
- Douching
- Lack of barrier protection
- Absence of or decrease in lactobacilli
- Lack of H₂O₂-producing lactobacilli

17

Slide 18

Bacterial Vaginosis Curriculum Epidemiology

Transmission

- Currently not considered a sexually transmitted disease, but acquisition appears to be related to sexual activity

18

Slide 19

Bacterial Vaginosis Curriculum

Lesson II: Pathogenesis

19

Slide 20

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

20

Slide 21

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

21

Slide 22

Bacterial Vaginosis Curriculum

Lesson III: Clinical Manifestations

22

Slide 23

Bacterial Vaginosis Curriculum Clinical Manifestations

Clinical Presentation and Symptoms

- Most women are asymptomatic
- Signs/symptoms when present:
 - Reported malodorous (fishy smelling) vaginal discharge
 - Reported more commonly after vaginal intercourse and after completion of menses
- Symptoms may remit spontaneously

23

Slide 24

Bacterial Vaginosis Curriculum

Lesson VI: Diagnosis

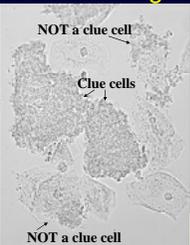
24

Slide 25

Bacterial Vaginosis Curriculum Diagnosis

Wet Prep: Bacterial Vaginosis

Saline: 40X objective



NOT a clue cell

Clue cells

NOT a clue cell

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

25

Slide 26

Bacterial Vaginosis Curriculum Diagnosis

BV Diagnosis: Amsel Criteria

Amsel Criteria:
Must have at least three of the following findings:

- Vaginal pH >4.5
- Presence of >20% per HPF of "clue cells" on wet mount examination
- Positive amine or "whiff" test
- Homogeneous, non-viscous, milky-white discharge adherent to the vaginal walls

26

Slide 27

Bacterial Vaginosis Curriculum Diagnosis

Other Diagnostic Tools

- Vaginal Gram stain (Nugent or Speigel criteria)
- Culture
- DNA probe
- Newer diagnostic modalities include:
 - PIP activity
 - Sialidase tests

27

Slide 28

Bacterial Vaginosis Curriculum

Lesson V: Patient Management

28

Slide 29

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 grams) intravaginally, once a day for 5 days, OR
- Clindamycin cream 2%, one full applicator (5 grams) intravaginally at bedtime for 7 days

Alternative regimens:

- 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 6 months may reduce recurrences

29

Slide 30

Bacterial Vaginosis Curriculum Management

Treatment in Pregnancy

- Pregnant women with symptomatic disease should be treated with
 - Metronidazole 500 mg twice a day for 7 days, OR
 - Metronidazole 250 mg orally 3 times a day for 7 days, OR
 - Clindamycin 300 mg orally twice a day for 7 days
- Asymptomatic high-risk women (those who have previously delivered a premature infant)
 - Some experts recommend screening and treatment at first prenatal visit; and
 - A follow-up evaluation at 1 month after completion of therapy

30

Slide 31

Bacterial Vaginosis Curriculum Management

Screening and Treatment in Asymptomatic Patients

- Therapy is not recommended for male partners of women with BV
- Female partners of women with BV should be examined and treated if BV is present
- Screen and treat women prior to surgical abortion or hysterectomy

31

Slide 32

Bacterial Vaginosis Curriculum Management

Recurrence

- Recurrence rate is 20-40% 1 month after therapy
- Recurrence may be a result of persistence of BV-associated organisms and 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 6 months may reduce recurrences

32

Slide 33

Bacterial Vaginosis Curriculum

Lesson VI: Prevention

33

Slide 34

Bacterial Vaginosis Curriculum Prevention

Partner Management

- After multiple occurrences, some consider empiric treatment of male sex partners to see if recurrence rate diminishes, but this approach has not been validated.

34

Slide 35

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

35

Slide 36

Candidiasis Curriculum

Vaginitis

Vulvovaginal Candidiasis (VVC)



36

Slide 37

Candidiasis Curriculum

Learning Objectives

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

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

37

Slide 38

Candidiasis Curriculum

Lessons

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

38

Slide 39

Candidiasis Curriculum

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

39

Slide 40

Candidiasis Curriculum Epidemiology

VVC Epidemiology

- Affects most females during lifetime
- Most cases caused by *C. albicans* (85%-90%)
- Second most common cause of vaginitis
- Estimated cost: \$1 billion annually in the U.S.

40

Slide 41

Candidiasis Curriculum Epidemiology

Transmission

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

41

Slide 42

Candidiasis Curriculum

Lesson II: Pathogenesis

42

Slide 43

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

43

Slide 44

Candidiasis Curriculum

Lesson III: Clinical Manifestations

44

Slide 45

Candidiasis Curriculum Clinical Manifestations

Clinical Presentation and Symptoms

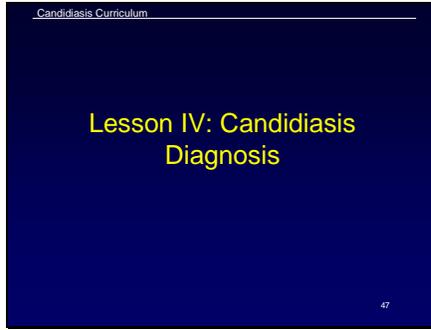
- Vulvar pruritis is most common symptom
- Thick, white, curdy vaginal discharge ("cottage cheese-like")
- Erythema, irritation, occasional erythematous "satellite" lesion
- External dysuria and dyspareunia

45

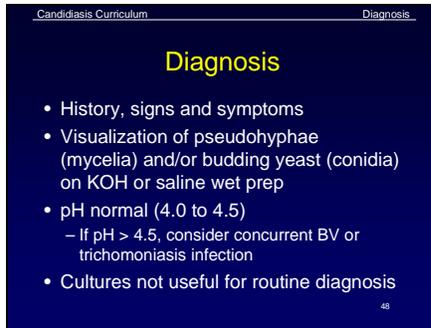
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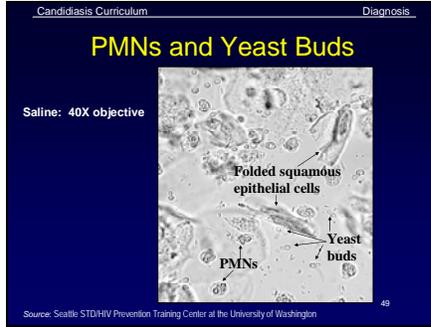
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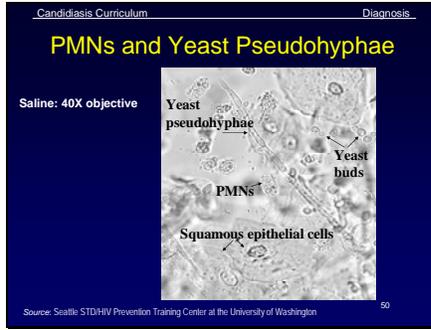
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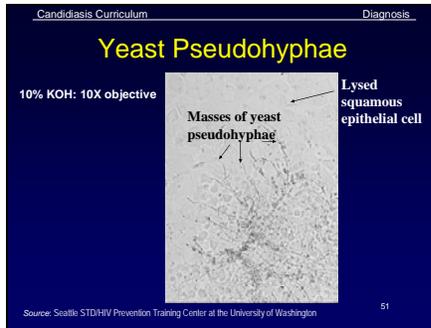
Slide 49



Slide 50



Slide 51



Slide 52

Candidiasis Curriculum

Lesson V: Patient Management

62

Slide 53

Candidiasis Curriculum Management

Classification of VVC

<u>Uncomplicated VVC</u> <ul style="list-style-type: none">- Sporadic or infrequent vulvovaginal candidiasis Or <ul style="list-style-type: none">- Mild-to-moderate vulvovaginal candidiasis Or <ul style="list-style-type: none">- Likely to be <i>C. albicans</i> Or <ul style="list-style-type: none">- Non-immunocompromised women	<u>Complicated VVC</u> <ul style="list-style-type: none">- Recurrent vulvovaginal candidiasis (RVVC) Or <ul style="list-style-type: none">- Severe vulvovaginal candidiasis Or <ul style="list-style-type: none">- Non-albicans candidiasis Or <ul style="list-style-type: none">- Women with uncontrolled diabetes, debilitation, or immunosuppression or those who are pregnant
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63

Slide 54

Candidiasis Curriculum Management

Uncomplicated VVC

- Mild to moderate signs and symptoms
- Non-recurrent
- 75% of women have at least one episode
- Responds to short course regimen

64

Slide 55

Candidiasis Curriculum Management

CDC-Recommended Treatment Regimens

- **Intravaginal agents:**
 - Butoconazole 2% cream, 5 g intravaginally for 3 days†
 - Butoconazole 2% sustained release cream, 5 g single intravaginally application
 - Clotrimazole 1% cream 5 g intravaginally for 7-14 days†
 - Clotrimazole 100 mg vaginal tablet for 7 days
 - Clotrimazole 100 mg vaginal tablet, 2 tablets for 3 days
 - Miconazole 2% cream 5 g intravaginally for 7 days†
 - Miconazole 100 mg vaginal suppository, 1 suppository for 7 days†
 - Miconazole 200 mg vaginal suppository, 1 suppository for 3 days†
 - Miconazole 1,200 mg vaginal suppository, one suppository for 1 day
 - Nystatin 100,000-unit vaginal tablet, 1 tablet for 14 days †
 - Tioconazole 6.5% ointment 5 g intravaginally in a single application†
 - Terconazole 0.4% cream 5 g intravaginally for 7 days
 - Terconazole 0.8% cream 5 g intravaginally for 3 days
 - Terconazole 80 mg vaginal suppository, 1 suppository for 3 days
- **Oral agent:**
 - Fluconazole 150 mg oral tablet, 1 tablet in a single dose

Note: The creams and suppositories in these regimen are oil-based and may weaken latex condoms and diaphragms. Refer to product labeling for further information.
† Over-the-counter (OTC) preparations.

55

Slide 56

Candidiasis Curriculum Management

Complicated VVC

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

56

Slide 57

Candidiasis Curriculum Management

Complicated VVC Treatment

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

57

Slide 58

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

58

Slide 59

Candidiasis Curriculum

Lesson VI: Prevention

59

Slide 60

Candidiasis Curriculum Prevention

Partner Management

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

60

Slide 61

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

61

Slide 62

Trichomoniasis Curriculum

Vaginitis

Trichomonas vaginalis



62

Slide 63

Trichomoniasis Curriculum

Learning Objectives

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

1. Describe the epidemiology of trichomoniasis in the U.S.
2. Describe the pathogenesis of *T. vaginalis*.
3. Describe the clinical manifestations of trichomoniasis.
4. Identify common methods used in the diagnosis of trichomoniasis.
5. List CDC-recommended treatment regimens for trichomoniasis.
6. Describe patient follow up and partner management for trichomoniasis.
7. Describe appropriate prevention counseling messages for patients with trichomoniasis.

63

Slide 64

Trichomoniasis Curriculum

Lessons

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

64

Slide 65

Trichomoniasis Curriculum

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

65

Slide 66

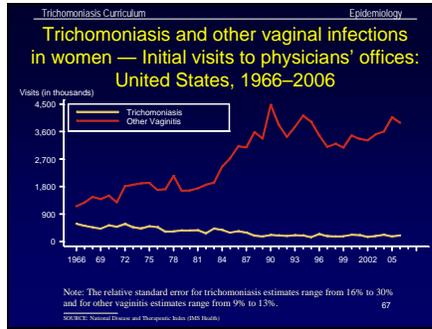
Trichomoniasis Curriculum Epidemiology

Incidence and Prevalence

- Most common treatable STD
- Estimated 3-5 million cases annually in the U.S. at a medical cost of \$375 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
 - 50%-60% in female prison inmates and commercial sex workers
 - 18%-50% in females with vaginal complaints

66

Slide 67



Slide 68

- Trichomoniasis Curriculum Epidemiology
- ### Risk Factors
- Multiple sexual partners
 - Lower socioeconomic status
 - History of STDs
 - Lack of condom use
- 68

Slide 69

- Trichomoniasis Curriculum Epidemiology
- ### Transmission
- Almost always sexually transmitted
 - Females and males may be asymptomatic
 - Transmission between female sex partners has been documented
- 69

Slide 70

Trichomoniasis Curriculum

Lesson II: Pathogenesis

70

Slide 71

Trichomoniasis Curriculum Pathogenesis

Microbiology

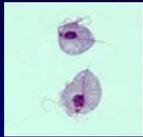
- Etiologic agent
 - *Trichomonas vaginalis* - flagellated anaerobic protozoa
 - Only protozoan that infects the genital tract
- Associations with
 - Pre-term rupture of membranes and pre-term delivery
 - Increased risk of HIV acquisition

71

Slide 72

Trichomoniasis Curriculum Pathogenesis

Trichomonas vaginalis



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

72

Slide 73

Trichomoniasis Curriculum

Lesson III: Clinical Manifestations

73

Slide 74

Trichomoniasis Curriculum Clinical Manifestations

Clinical Presentation and Symptoms in Women

- May be asymptomatic in women
- Vaginitis
 - Frothy gray or yellow-green vaginal discharge
 - Pruritus
 - Cervical petechiae ("strawberry cervix") - classic presentation, occurs in $\leq 2\%$ of cases
- May also infect Skene's glands and urethra, where the organisms may not be susceptible to topical therapy

74

Slide 75

Trichomoniasis Curriculum Clinical Manifestations

"Strawberry cervix" due to *T. vaginalis*



75

Source: Claire E. Stevens/Seattle STD/HIV Prevention Training Center at the University of Washington

Slide 76

Trichomoniasis Curriculum Clinical Manifestations

T. vaginalis in Men

- May cause up to 11%-13% of nongonococcal urethritis in males
- Urethral trichomoniasis has been associated with increased shedding of HIV in HIV-infected men

76

Slide 77

Trichomoniasis Curriculum

Lesson IV: Diagnosis

77

Slide 78

Trichomoniasis Curriculum Diagnosis

Diagnosis- Females

- **Motile** trichomonads seen on saline wet mount
- Vaginal pH >4.5 often present
- Culture is the "gold standard"
- Pap smear has limited sensitivity and low specificity
- DNA probe
- Rapid test

78

Slide 79

Trichomoniasis Curriculum Diagnosis

Diagnosis- Males

- First void urine concentrated
 - Examine for motile trichomonads
 - Culture
- Urethral swab
 - Culture

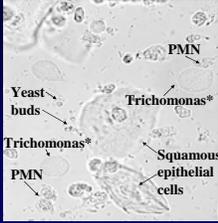
79

Slide 80

Trichomoniasis Curriculum Diagnosis

Wet Prep: Trichomoniasis

Saline: 40X objective



*Trichomonas shown for size reference only; must be motile for identification
Source: Seattle STD/HIV Prevention Training Center at the University of Washington

80

Slide 81

Trichomoniasis Curriculum

Lesson V: Patient Management

81

Slide 82

Trichomoniasis Curriculum Management

Treatment

- CDC-recommended regimen
 - Metronidazole 2 g orally in a single dose OR
 - Tinidazole 2 g orally in a single dose
- CDC-recommended alternative regimen
 - Metronidazole 500 mg twice a day for 7 days

82

Slide 83

Trichomoniasis Curriculum Management

Pregnancy

- CDC-recommended regimen
 - Metronidazole 2 g orally in a single dose
- No consistent association between metronidazole use in pregnancy and teratogenic effects

83

Slide 84

Trichomoniasis Curriculum Management

Treatment Failure

- A common reason for treatment failure is reinfection: assure treatment of sex partners.
- If treatment failure occurs with metronidazole 2 g orally in a single dose for all partners, can 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
 - 770-488-4115
 - www.cdc.gov/std

84

Slide 85

Trichomoniasis Curriculum

Lesson VI: Prevention

85

Slide 86

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)

86

Slide 87

Trichomoniasis Curriculum Prevention

Patient Counseling and Education

- Nature of the disease
 - May be symptomatic or asymptomatic, douching may worsen vaginal discharge, untreated trichomoniasis associated with adverse pregnancy outcomes
- Transmission issues
 - Almost always sexually transmitted, fomite transmission rare, may persist for months to years, associated with increased susceptibility to HIV acquisition

87

Slide 88

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 *T. vaginalis*

88

Slide 89

Case Study

89

Slide 90

Case Study



History

Tanya Walters

- 24-year-old single female
- Presents with complaints of a smelly, yellow vaginal discharge and slight dysuria for 1 week
- Denies vulvar itching, pelvic pain, or fever
- 2 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 1 year ago
- Last check up 1 year ago

90

Slide 91

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

91

Slide 92

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?

92

Slide 93

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 hyphae

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

93

Slide 94

Case Study

Partner Management



Jamie	Calvin
<ul style="list-style-type: none">Last sexual contact: 2 days agoFirst sexual contact: 2 months agoTwice a week, vaginal sex	<ul style="list-style-type: none">Last sexual contact: 6 months agoFirst sexual contact: 7 months ago3 times a week, vaginal and oral sex

6. How should Jamie and Calvin be managed?

94

Slide 95

Case Study

Follow-Up

- Tanya was prescribed metronidazole 2 g orally, and was instructed to abstain from sexual intercourse until her 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 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 recommendations for Tanya?

95
