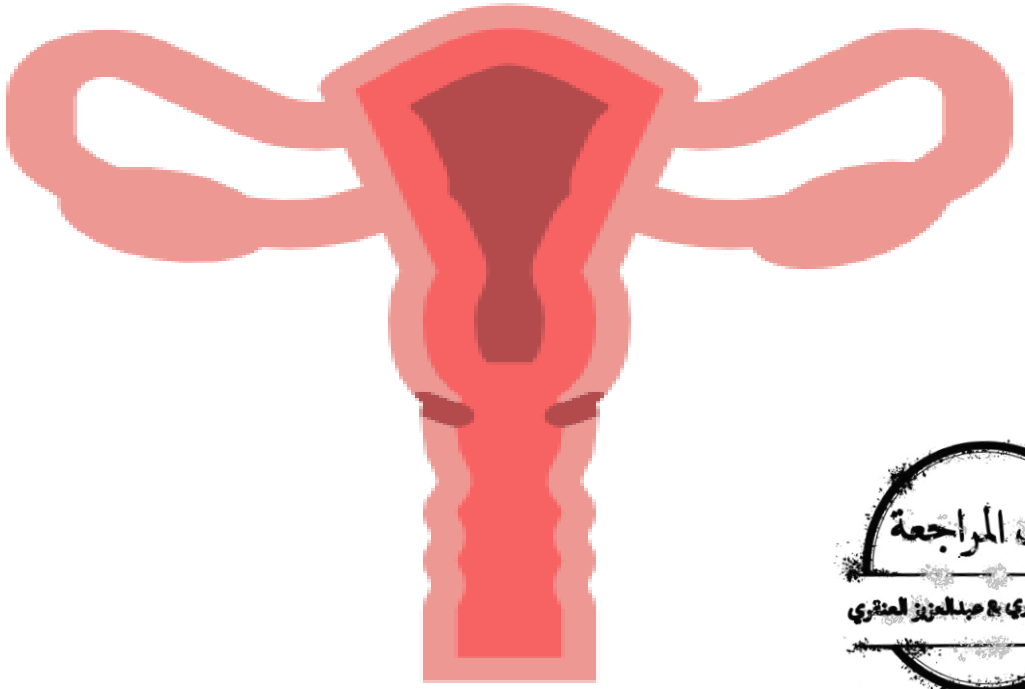
MEDICINE
KING SAUD UNIVERSITY

MICROBIOLOGY436



تمت المراجعة
شوق الأحمري & عبدالعزيز العنقري

LECTURE: Candida infection Tricpmonas vaginalis Bacterial vaginosis

Editing File

- Important
- Doctor's notes
- Extra explanation
- **Only F** or **only M**

"لا حول ولا قوة إلا بالله العلي العظيم" وتقال هذه الجملة إذا داهم الإنسان أمر عظيم لا يستطيعه ، أو يصعب عليه القيام به .

The human vagina:

- Lined with 25 layers of epithelium cells.
- Separation of microbial pathogens from the normal genital microbiota.

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- ✓ Lactobacilli (normal flora)
- ✓ Corynebacterium spp.
- ✓ Gardnerella vaginalis
- ✓ coagulase-negative: (staphylococci - Staphylococcus aureus)
- ✓ Streptococcus agalactiae (group B)
- ✓ Enterococcus spp.
- ✓ Escherichia coli
- ✓ Anaerobes
- ✓ Yeasts

Characteristics of the Vagina and Cervix	**Vagina**	**Cervix**
pH	<4.5	7.0
Epithelial cells	Squamous	Columnar
Pathogens/ Syndrome	Bacterial vaginosis *Candida species* *Trichomonas vaginalis*	*Neisseria gonorrhoeae* \ *Chlamydia trachomatis*

Abnormal vaginal secretion:

- **Normal physiological vaginal secretion**
- **Vaginal infection in order of prevalence :**
  - ✓ Bacterial vaginnosis
  - ✓ Vulvovaginitis candiasis
  - ✓ trichimoniasis

المحاضرة بتتكلم عن هذه الأنواع الثلاث

- **Desquamative inflammatory vaginitis**
- **Cervicitis:** Infectious or Noninfectious
- **Estrogen deficiency**

Characteristic of normal vaginal secretion:

- Desquamated vaginal epithelial cell
- Lactobacilli (normal flora) dominate
- PH 3.5 to 4.6 (lactobacilli changes ph levels)
- Oderless
- No itching or irritation
- Deonot soil underclothing

Vaginal PH examination

Types of infection:

Females	Males	Pregnant females	Children and postmenopausal women
• Cervicitis usually STD • Vulvovaginitis • Urethritis • Bacterial vaginosis (BV) • Salpingitis (pelvic inflammatory disease [PID]) • Endometritis • Genital ulcers	• Urethritis • Epididymitis • Prostatitis • Genital ulcers	Disease in the neonate.	

- VAGINOSIS /VAGINITIS: Most common reason for patient visit to OB/GYN.

History & symptoms of vulvovaginitis:

History	symptoms
• General gynecological history: (age Neonatal, pregnancy, prepubescent, atrophic post menopause) • Onset, Esterogen depletion: (**Menstrual history**, **Pregnancy**, **Sexual** Hx, Contraception, Sexual relationship, Prior infection) • General medical history: (**Allergies**, **DM**, Malignancies, **Immunodeficiency**) Candida is related to immunity • Medication OCP< **steroids**, duches.	✓ Discharge (quality scanty)physiological OCP ✓ Oder (BV,FB,EV fistula) ✓ Valvular discomfort (HSV) ✓ Dyspareunia (pain during intercourse) ✓ Abdominal pain (when it goes to the fallopian tube “complication”) (tricho) PID ✓ itching

Examination:

- ✓ Breast Exam patient: breast also to detect early breast cancer
- ✓ Adequate illumination
- ✓ Magnification if possible
- ✓ Give a patient mirror
- ✓ Inspect external genetalia: (Lesions – Erythema)
- ✓ Vaginal mucosa: (Erythema – Lesion - Secretion)
- ✓ Examination of cervix: (Ectropion – Lesions – Erythema - Endocervical secretion)
- ✓ Collect cervical and vaginal specimen
- ✓ Bimanual examination

Causes of vulvovaginitis only in male's slides

- ✓ Bacterial : Bacterial vaginosis (40%)
- ✓ Fungal : Candida vulvovaginitis (25%)
- ✓ Parasitic : trichomonal vulvovaginitis (25%)
- ✓ Low estrogen levels (called "atrophic vaginitis")
- ✓ Allergic or irritation or injury response from spermicidal products, condoms, soaps, and bubble bath called "contact vulvovaginitis".

Doctor notes:

- Patient with STD we should check for the rest of STDs infection like HIV
- Child have vulvovaginitis :Is indicator for child abuse
- Ulcers are sexually transmitted : Like genital herps, papilloma virus and syphilis
- Using bathroom after person affected is not at risk
- Vaginal infection physiological changes : cervicitis can be infectious or non infectious , estrogen is involved that's why pregnant or premenopausal and post menopausal is more susceptible
- vaginal discharge: Thick white →candida - yellow → trichomonas
- Itching and rash and ulcer → candida
- STDs make cilia destructed and scar and ectopic pregnancy happen

Classification of vulvovaginitis:

Uncomplicated	Complicated
-Sporadic -No underlying disease -By Candida albican -Not pregnanat -Mild to moderate severity • Any available topical agent • Fluconazole 150mg as a single oral dose	-Underlying illness: (HIV – DM) -Recurrent infection 4 or more per year -Non albican candida -Pregnancy -Sever infection • Culture confirmation mandatory • Antifungal suscep. Testing • Treat for 10-14 days with vaginal or oral agent • Other topical: (Boric acid - 5 fluorocytocine) • Consider treatment of the partners • Long term suppressive treatment for frequently recurrent diseases

1- Candida infections (yeast infection moniliasis) Candida is most common infection

- Candidiasis or thrush is a fungal infection (mycosis) of any of the Candida species (yeasts) of which Candida albicans is the most common
- Common superficial infections of skin and mucosal membranes by Candida causing local inflammation and discomfort
- Budding yeast and no pseudohyphae in patients with C.glabrata..

Candidal vulvovaginitis (vaginal thrush): Similar to :Urinary infection

- Infection of the vagina's mucous membranes by Candida albicans.
- 75% of adult women – between 20-30 years
- candida albicans Found naturally in the vagina

Types of candidal vulvovaginitis:

Uncomplicated thrush	Complicated thrush
-single episode/less than four episodes in a year. -mild or moderate symptoms -caused by the Candida albicans	-four or more episodes in a year. -severe symptoms. -Pregnancy -poorly controlled diabetes/immune deficiency. -not caused by the Candida albicans

Odorless with itching: candida thin watery cheesy which there is hash itching

1- Candida infections:

Risk factors	Symptoms	Diagnosis
-Broad-spectrum Antibiotics -Pregnancy because of hormones which make them more susceptible to infection -Diabetes (poorly controlled) -Immunodeficiency -Contraceptives -Sexual behavior -Tight-fitting clothing -Female hygiene -Hormonal changes -Change in vaginal acidity. -Use of corticosteroid medications	• Vulval itching • Vulval soreness and irritation • Superficial dyspareunia. • Pruritus, soreness • Dysuria • Odourless vaginal discharge: (thin and watery or thick and white cheese-like) • Erythema (redness) • Fissuring • satellite lesions. 	• History & symptoms • physical and pelvic exam • Wet prep to see clumps of pseudohyphae. • KOH prep helpful but not always necessary. • Candidiasis can be similar to other diseases: -Sexually transmitted diseases -Chlamydia -Trichomoniasis -Bcterial vaginosis -Gonorrhea 

Treatment:

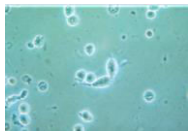
✓**Butoconazole cream**
✓**Clotrimazole: (** 1% cream or vaginal tablet**)**
✓**Miconazole: (**2% cream or vagina suppository**)**
✓**Nystatin:** vaginal tablet
✓**Oral Agent:** Fluconazole - oral one tablet in single dose

Short-course topical formulations:

- single dose and regimens of 1–3 days
- effectively treat uncomplicated candidal vulvovaginitis
- Topical azole drugs are more effective than nystatin
- Azole drugs relief of symptoms in 80%–90% of cases.

Treatment failure: In up to 20% of cases (If the symptoms do not clear within 7–14 days)

2- Trichomoniasis: (sexually-transmitted infection)

The wet mount's fast results

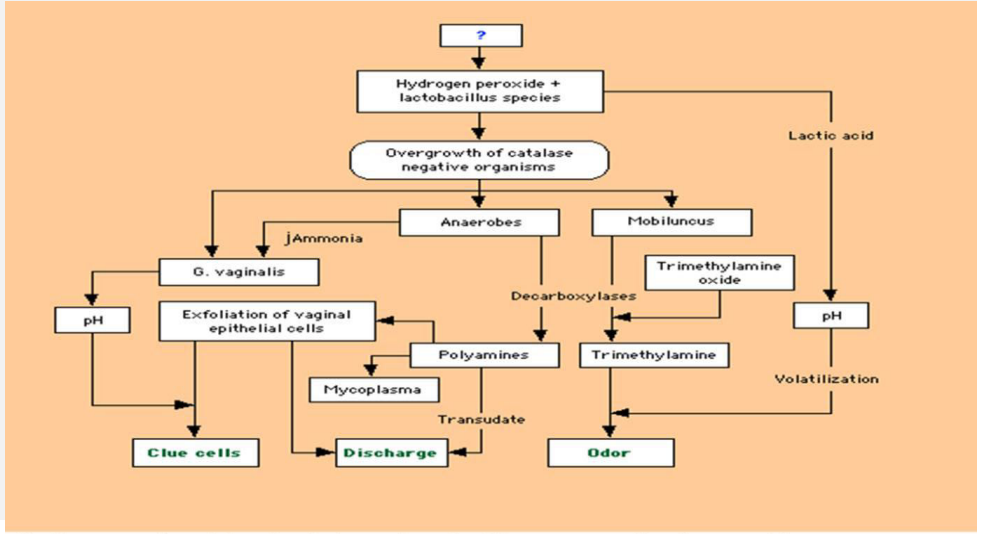
- Parasite flagellated
- *Trichomonas* is the most prevalent non-viral sexually transmitted disease (STD) agent

Symptoms:	• Purulent vaginal discharge • Yellow- greenish to grey in color • Sometimes frothy	• Dyspareunia • Abnormal vaginal odor, • Males usually asymptomatic, but can cause Non-gonococcal urethritis	• Vulvar irritation (strawberry) • Dysurea, pruritus
Diagnosis:	• Culture is considered the gold standard for the diagnosis of trichomoniasis. Its disadvantages include cost and prolonged time before diagnosis لذلك لا تستعمل • Other Methods of Diagnosis: EISA :Sensitivity 91.6% - Specificity 97.7% \ DNA Probe	
Management:	1- Confirm the diagnosis: Wet preparation (miss 30%) \ Culture \ Gram Stain 2-Confirm all current sexual partners treated	3-Oral metronidazole: • 500 mg bid for 7 days • 2 g daily for 3-5 days 4- If Rx failure : • Consultation with experts • Susceptibility testing • Higher dose of metronidazole • Alternative Tinidazole
Complications	Trichomonas associated with: • Premature rupture of membranes • Preterm labor and birth	• Low birth weight • Increased transmission of other STDs including HIV	

نعرف الدايقنوز لمن نشوف الباراسايت تحت المايكرسكوب فمانحتاج نسوي كلتشر

3- Bacterial Vaginosis: Floral imbalance تحصل لمن تقل اللاكتوباسيلاي وتزيد القرادنيريلا

- *Lactobacillus acidophilus*: anaerobic bacteria
  -Compete with other microorganisms for adherence to epithelial cells
  -Produce antimicrobial compounds such as organic acids (which lower the vaginal pH) hydrogen peroxide, and bacteriocin-like substances make acidety by fermintation and acidety is protecting
- *Gardnerella vaginalis* normally in low quantity
- *Mycoplasma hominis*
- *Mobiluncus species*
- Anaerobes:
  -*Bacteroides (Porphyromonas)*
  -*Peptostreptococcus*
  -*Fusobacterium*
  -*Prevotella*



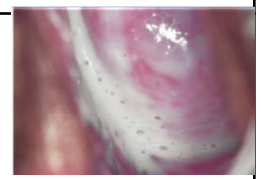
Pathogenesis of bacterial vaginosis. The overgrowth of anaerobic microorganisms is accompanied by the production of proteolytic enzymes that act on vaginal peptides to release several biologic products, including polyamines, which volatize in the accompanying alkaline environment to elaborate foul-smelling trimethylamine. Polyamines facilitate the transudation of vaginal fluid and exfoliation of epithelial cells, creating a copious discharge. Clue cells are formed when Gardnerella vaginalis, present in high numbers, adhere to exfoliated epithelial cells in the presence of an elevated pH. (Redrawn by permission from Sobel, JD, N Engl J Med 1997; 337:1896-1903. Copyright© 1997 Massachusetts Medical Society. All rights reserved.)

Pathogenesis

- Marked reduction in lactobacillus Lactobacilli adjust your ph 3.4-4.6
  -Decreased hydrogen peroxide production
- Polymicrobial superficial infection: overgrowth of G. vaginalis and anaerobic bacteria
  -Lactobacilli predominate after metronidazole treatment

3- Bacterial Vaginosis:

Epidemiology	The most common vaginal infection in women of childbearing age-29%
Risk factors	Multiple or new sexual partners -(sexual activity alteration of vaginal pH) -Early age of first sexual intercourse -Douching -Cigarette smoking -Use of IUD -Although sexual activity is a risk factor for the infection, bacterial vaginosis can occur in women who have never had vaginal intercourse
Clinical Features	• Most cases (50-75%) Homogenous grey vaginal discharge with less itching • Dysuria and dyspareunia rare • Pruritus and inflammation are absent • Fishy vaginal discharge: During menstruation, After intercourse • Minimal itching or irritation • Burning • Thin milky white or grey vaginal discharge • Absence of inflammation is the basis of the term "vaginosis" rather than vaginitis



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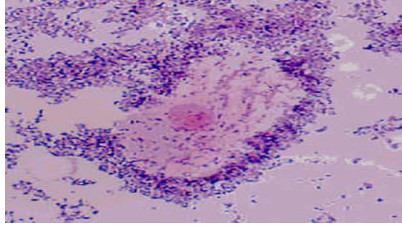
- Bacterial Vaginosis complications

OB complications	GYN complications
• Preterm delivery • Premature rupture of • membranes • Amniotic fluid infection • Chorioamnionitis • Postpartum endometritis • Premature labor • Low birth weight	• Pelvic inflammatory • disease (PID) • Postaportal pelvic • inflammatory disease • Post hysterectomy infections • Mucopurulent cervicitis • Endometritis • Increased risk of HIV , STD

3- Bacterial Vaginosis:



Diagnostic Methods:

- Clinical :
  - ✓ Related symptoms and sexual history.
  - ✓ Examination of introitus may reveal erythema of the vulva and edema of the labia.
  - ✓ Speculum examination.
  - ✓ A sample of the vaginal swab
- microscopic Criteria
- Gram Stain ("Gold Standard"): mixed small gram-positive and gram-negative rods ± curved rods = BV.
  - ✓ Clue cells on saline wet mount of vaginal discharge (on >20% cells) Bacteria adhered to epithelial cells; most reliable single indicator
- Vaginal pH > 4.5 , whiff amine test
- Elevated pH and increased amine : Sensitivity 87%; Specificity 92%
- Culture: poor predictive value for G. vaginalis as prevalent in healthy asymptomatic women
- DNA probes- expensive, poor predictive value alone

Clinical diagnose 3 out of 4 :
1-ph greater than 4.5
2-positive whiff test
3-any clue cells
4- homogenous discharge

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Office Diagnostics for Vaginitis:	• Empiric diagnoses often inaccurate and lead to incorrect treatment and management. • Need for rapid, accurate and inexpensive diagnostic tests.		
OFFICE-BASED TESTS FOR VAGINITIS ARE UNDERUTLIZED:	Simple, inexpensive, office-based tests were underutilized:		
	Microscopy	PH measurement	Whiff amine test

3- Bacterial Vaginosis:

Treatment Recommendations:

Oral treatment	Oral metronidazole 500 mg bid x 7 days ($5) Act only on anaerobes (not candida)	✓ 84-96% cure rate ✓ Single dose therapy (2g) may be less effective
	Oral Clindamycin 300 mg bid x 7 days ($28)	✓ Less effective
Topical treatments (higher recurrence rates)	Metronidazole gel (0.75%) 5 g PV qhs x 5 days ($30)	✓ 70-80% cure rate
	--Clindamycin cream (2%) 5 g PV qhs x 7 days ($31)	✓ Less effective ✓ May lead to Clindamycin resistant anaerobic bacteria

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PH TEST	KOH "WHIFF" TEST	WET MOUNT PREPARATION
• PH indicator strips: pH 3.5 - 7.0 • Place sample of vaginal secretion on test strip: read while still moist. • PH>4.5 indicates abnormality (i.e. *BV-Trichomonas- or menstrual blood).* • Be careful not to sample the cervix; cervical secretions and blood have a PH 7.0	Sample of vaginal secretions are placed in a test tube with 10% KOH. KOH alkalizes amines produced by anaerobic bacteria-results in a sharp "fishy odor"	Vaginal secretion sample from the anterior fornix and lateral wall Place swab in test tube with small amount of normal saline and place sample on glass slide with cover slip Visualize at both low and high power Clue cells, yeast, *Trichomonas*, WBC, bacteria.

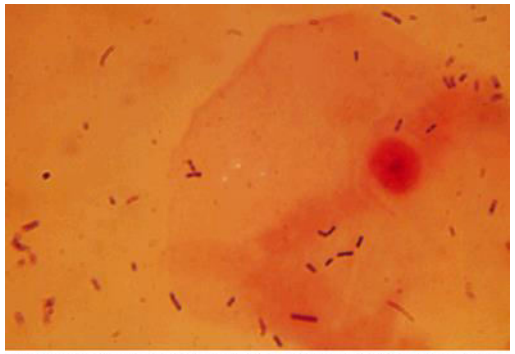
Diagnosis by Gram Stain

Gram Stain Scoring System for Diagnosis of Bacterial Vaginosis†

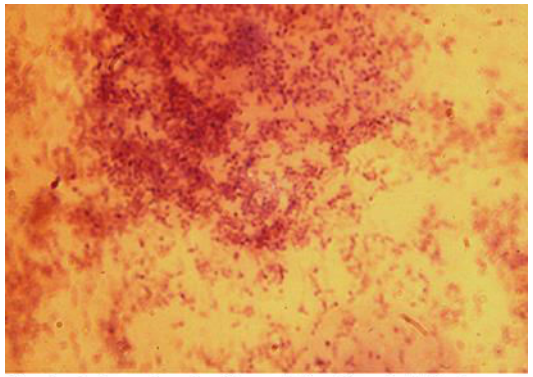
Score	Lactobacillus morphotypes	Gardnerella and Bacteroides morphotypes	Curved gram-variable rods
0	4+	0	0
1	3+	1+	1+ or 2+
2	2+	2+	3+ or 4+
3	1+	3+	
4	0	4+	

The score is determined by the average number of each morphotype seen per oil-immersion field, but varies with the type of bacteria. Excluding lactobacillus morphotypes, a score of 0 means no morphotypes are present; 1, 0 to 1 morphotype present per high power field; 2, 1 to 4 morphotypes present; 3, 5 to 30 morphotypes present; 4, 30 or more morphotypes present. A total score of 7 to 10 is indicative of bacterial vaginosis infection, 4 to 6 is indeterminate, and 0 to 3 is normal. (Total score = lactobacilli score and Gardnerella vaginalis score and Bacteroides species score and curved gram variable rod score).

†Adapted from data in Nugent, RP. J Clin Microbiol 1991; 29:291.



Normal vaginal flora Gram stain of vaginal contents (x1000) shows an epithelial cell with well-visualized borders and Gram positive rods similar to lactobacilli. The smear suggests normal vaginal flora, not bacterial vaginosis. Courtesy of Harriet Provine.



Bacterial vaginosis Gram stain of vaginal discharge (x1000) from a patient with bacterial vaginosis shows the borders of an epithelial cell obscured by small, Gram variable coccobacilli. Courtesy of Harriet Provine.

Specimen Obtained during gynecological examination

- **Vaginal secretion**
  - PH - Saline wet preparation - KOH wet preparation*
- **Cervical cultural and non cultural**
  - GC - C.trachomatis
- **Cervical cytological examination if not documented within previous 12 months**
- **Vaginal culture**

  - Candida: Vaginal Yeast Culture: - Trichomonas vaginalis**
    - Probably not routinely indicated - many women are colonized with Candida
    - If obtained must correlate with patient signs and symptoms
    - For recurrent infections culture and susceptibility testing may be helpful

دكتورة فوزية قالت هذا زيادة من عندي

Routine bacterial cultures /not helpful

- Routine NOT helpful
- Wet mount- 60% sensitive (Trichomoniasis ,BV)
- Abnormal or foul odor using a (KOH) "whiff test,"
- The Gram stain is useful to diagnose BV : Using the Nugent scoring system
- A wet mount+ a yeast culture and *Trichomonas* culture: Recommended tests to diagnose vaginitis.
- Performing only a wet mount, without yeast or *Trichomonas* culture: 50% of either of these agents of vaginitis will be missed
- A sensitive DNA probe assay is available: Combines the detection of yeasts, *Trichomonas,* and G. *vaginalis* as a marker for BV

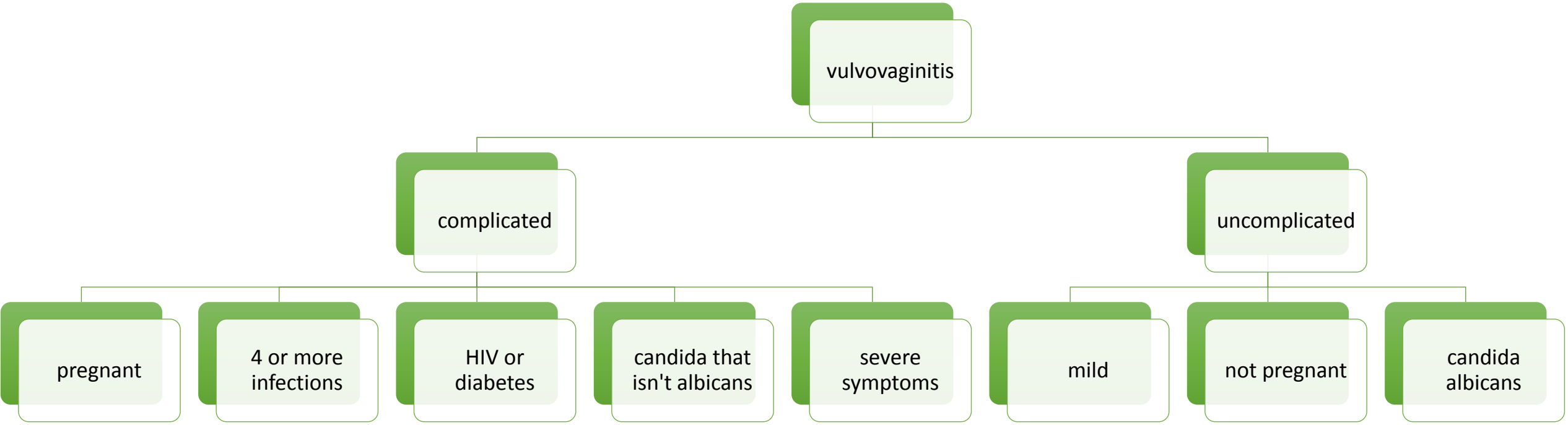
*يستخدم لتشخيص الباراسيتك انفكشنز

** مانستخدم كلتشر نستخدم الوت مونت عشان نشوف الترافوزويت أو القرام ستين

موجودة في سلايدات الدكتور فقط , اعتبروها زي الملخص

Clinical syndrome	Etiology	Treatment
Bacterial vaginosis Malodorous vaginal discharge, pH >4.5	Etiology unclear: associated with Gardenella vaginalis mobiluncus, Prevotella sp.,	**Metronidazole** Tinidazole
Trichomoniasis Copious foamy discharge, pH >4.5 Treat sexual partners	Trichomonas vaginalis	**Metronidazole** Tinidazole
Candidiasis Pruritus, thick cheesy discharge, pH <4.5	Candida albicans 80-90%. C. Glabrata C. tropicalis	**Oral azole: Fluconazole** Itraconazole

SUMMARY:


vulvovaginitis
complicated
uncomplicated
pregnant
4 or more infections
HIV or diabetes
candida that isn't albicans
severe symptoms
mild
not pregnant
candida albicans

SUMMARY:

infection	Risk factors	Symptoms	Diagnosis	treatment
Candidal vulvovaginitis "vaginal thrush"	• Antibiotics • Pregnancy • DM • OCP • Sexual behavior	• Vulval itching (soreness and irritation) • Dysuria and dyspareunia • Odorless vaginal discharge (cheese like or thin and watery) • Erythema • Fissures • Satellite lesions	History and pelvic exam	• Butoconazole • Clotrimazole • Miconazole • Nystatin • Oral agent: fluconazole
Trichomoniasis (STD)	--	• Purulent vaginal discharge (yellow-green) • Vulvar irritation (strawberry) • Dysuria and dyspareunia • Abnormal vaginal odor	Culture is gold standard	• Oral metronidazole • Check all current sexual partners
Bacterial vaginosis	• Multiple sex partners • Antibiotics • Douching • IUD	• Grey/white discharge • Dysuria and dyspuerenia • Fishy vaginal odor • Minimal itching or irritation (no inflammation)	Gram stain is gold standard Clue cells on went mount	• Metronidazole • Clindamycin Oral or topical

QUIZ:

1. What is the gold standard test for Trichomoniasis?

    a. Culture
    b. Gram stain
    c. Wet mount

2. 25 year old female comes in complaining of vulvar irritation and itching. She says she also has discharge that has a fishy odor. What's the most likely causative organism?

    a. Candida albicans
    b. Gardenella Vaginalis
    c. Trichomoniasis

3. Patient comes in with a case of vulvovaginitis due to C.Albicans. This is the 5th time she has suffered from the same infection within the last 11 months. What type of vulvovaginitis ?

    a. complicated
    b. uncomplicated
    c. non of the above

4. Female diabetic patient comes in complaining of cheese like discharge and irritation. What is used for treatment?

    a. Gentamycin
    b. Butoconazole
    c. clindamycin

Answers: 1. a 2. b 3. a 4. b

THANK YOU FOR CHECKING OUR WORK, BEST OF LUCK!

Hamad Alkhudiry

Shrooq Alsomali
Safa Al-osaimi
Jawaher Alkhayyal
Najd Altheeb

Doctors slides