

# Candida infection, trichimonas vaginitis and bacterial vaginosis

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Editing File  
Summary

♥ Special thanks to Sarah Alobaid and Sarah Alaidaroos ♥

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# Objectives:

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- Know the terms : vulvitis, vaginitis and vulvovaginitis
- Describe the characteristics of the vagina and cervix in Women
- Compare prevalence of 3 primary infections: Bacterial vaginosis, candidiasis and Trichomoniasis
- Know clinical features and diagnosis of Bacterial vaginosis
- Know clinical features and diagnosis of vaginal yeast
- Know clinical features and diagnosis of Trichomoniasis

## Normal vagina

- Lined with 25 layers of epithelium cells.
- Separation of microbial pathogens from the normal genital microbiota.
- **Characteristic of normal vaginal secretion:**
  - Desquamated vaginal epithelial cell
  - Lactobacilli dominate
  - **PH 3.5 to 4.6 (Acidic)**
  - Odorless
  - No itching or irritation
  - Does not soil underclothing
- **Normal flora of the vagina:**
  - Lactobacilli
  - Corynebacterium spp.
  - Gardnerella vaginalis
  - coagulase-negative Staphylococci
  - Staphylococcus aureus
  - Streptococcus agalactiae
  - Enterococcus spp.
  - Escherichia coli
  - Anaerobes
  - Yeasts
- **Lactobacilli:**
  - Compete with other microorganisms for adherence to epithelial cells.
  - Produce antimicrobial compounds such as organic acids (which lower the vaginal pH), hydrogen peroxide (**Acidic**), and bacteriocin-like substances.
  - **Gram positive anaerobic rods**

## Abnormal vaginal secretion

- Normal physiological vaginal secretion **should be colorless and odorless**
- Causes of abnormal vaginal secretion:
- Vaginal infection:
  - Trichomoniasis - Vulvovaginitis candidiasis - Bacterial vaginosis
- Desquamative inflammatory vaginitis
- Cervicitis:
  - Infectious - Noninfectious
- Estrogen deficiency

## Types of infections

<b>Female</b>	<ul style="list-style-type: none"> <li>○ Cervicitis</li> <li>○ Vulvovaginitis</li> <li>○ Urethritis</li> <li>○ Bacterial vaginosis (BV)</li> <li>○ Salpingitis (pelvic inflammatory disease (PID))</li> </ul>	<ul style="list-style-type: none"> <li>○ Endometritis</li> <li>○ Genital ulcers</li> <li>○ Pregnant females: Disease in the neonate.</li> <li>○ Children and postmenopausal women</li> </ul>
<b>Male</b>	<ul style="list-style-type: none"> <li>○ Urethritis</li> <li>○ Epididymitis</li> <li>○ Prostatitis</li> <li>○ Genital ulcers</li> </ul>	

## Terminology and Pathogenesis

Dr.Ali: you should know the difference between Vaginitis and vaginosis

- **Vulvovaginitis, vulvitis, and vaginitis** :are general terms that refer to the **inflammation** of vagina and/ or vulva
- **Normal flora** in the vagina is **Lactobacilli** Mainly in adults.
- Changes in the vaginal acidity or disturb the normal bacteria in the vagina may predispose to an infection . It'll be happening later in life ( like in GI flora )

## Vaginosis / Vaginitis

- Most common reason for patient visit to OB/GYN
- **Three primary infections in order of prevalence:**
  1. Bacterial vaginosis
  2. Candidiasis
  3. Trichomoniasis
- **Causes of vulvovaginitis**
  1. **Bacterial:** **Bacterial vaginosis** (40%) **most common**
  2. **Fungal:** Candida vulvovaginitis (25%)
  3. **Parasitic:** Trichomonal vulvovaginitis (25%)
  4. **Low estrogen levels** (called "atrophic vaginitis")
  5. **Allergic or irritation or injury response** from spermicidal products, condoms, soaps, and bubble bath called "contact vulvovaginitis".

## Characteristics of the Vagina and Cervix in Women of Reproductive Age

	Vagina	Cervix
<b>PH</b>	<4.5	7.0
<b>Endothelial cells</b>	Squamous	Columnar
<b>Pathogens/Syndrome</b>	<ul style="list-style-type: none"> <li>- Bacterial vaginosis</li> <li>- Candida species</li> <li>- Trichomonas vaginalis</li> </ul>	<ul style="list-style-type: none"> <li>- Neisseria gonorrhoeae</li> <li>- Chlamydia trachomatis</li> </ul>

# Introduction

## History<sup>(1)</sup>

- General gynecological history (Age: Neonate, Prepubescent, Adolescent, Adult, Post menopausal (atrophic).
- Estrogen depletion Onset
- Menstrual history
- Pregnancy
- Sexual Hx
- Contraception
- Sexual relationships
- Prior infections
- General medical Hx: Allergies, DM,
- Malignancies, Immunodeficiency
- Medication: OCP, steroids, douche

## Girls slides only

## Symptoms

- Discharge: -quality -quantity: scanty -Physiological or due to OCP
- Odeur (BV, FB, EV fistula)
- Vulvar discomfort (HSV)
- Dyspareunia
- Abdominal pain (tricho) PID

## Girls slides only

## Examination

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>○ Breast for detection of abnormal masses</li> <li>○ Adequate illumination</li> <li>○ Magnification if possible</li> <li>○ Give a patient mirror</li> <li>○ Inspect external genitalia (lesions and Erythema)</li> </ul> | <ul style="list-style-type: none"> <li>○ Vaginal mucosa (lesions, Erythema and secretions)</li> <li>○ Examination of cervix (Ectropion, Lesions, Erythema and Endocervical secretion)</li> <li>○ Collect cervical and vaginal specimen</li> <li>○ Bimanual examination</li> </ul> |
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## Girls slides only

## Classification of vulvovaginitis

### Uncomplicated Vulvovaginitis

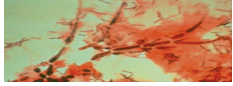
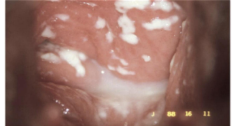

- Sporadic
- No underlying disease
- By Candida albicans
- Not pregnant
- Mild to moderate severity
- Any available topical agent
- Fluconazole 150mg as a single oral dose

### Complicated Vulvovaginitis

- Underlying illness (HIV, DM)
- Recurrent infection 4 or more per year
- Non albican candida
- Pregnancy
- Severe infection. Culture confirmation mandatory
- Antifungal suscep. Testing
- Treat for 10-14 days with vaginal or oral agent
- Other topical (Boric acid, 5 fluorocytosine)
- Consider treatment of the partners
- Long term suppressive treatment for frequently recurrent diseases

- History in vaginal discharge cases is very important because there are always predisposing factors. It also helps to know the risk factors and prevent the complications.

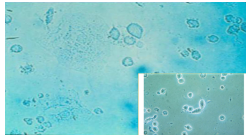
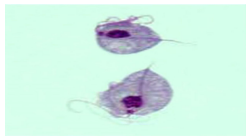

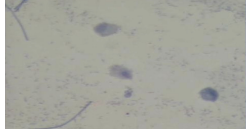
# Candidiasis

Candidiasis		
<ul style="list-style-type: none"> <li>○ Infection of the vagina's mucous membranes by <i>Candida albicans</i>.</li> <li>○ 75% of adult women</li> <li>○ Found naturally in the vagina</li> <li>○ <b>Overgrowth</b> of a normal inhabitant of the vagina.</li> <li>○ Pruritus, thick cheesy discharge PH&lt;4.5</li> <li>○ Candidiasis or thrush is a fungal infection (mycosis) of any of the <i>Candida</i> species (yeasts) of which <i>Candida albicans</i> is the most common.</li> <li>○ Common superficial infections of skin and mucosal membranes by <i>Candida</i> causing local inflammation and discomfort.</li> </ul>		
 <p><b>You will see candida Pseudohyphae or budding yeast</b></p>		
<b>Etiology</b> <small>Boys slides</small>	<ul style="list-style-type: none"> <li>○ <i>Candida albicans</i> 80 - 90%</li> <li>○ <b>C. Glabrata's</b></li> <li>○ <i>C. tropicalis</i></li> </ul>	
<b>Predisposing factors</b>	<ul style="list-style-type: none"> <li>○ Pregnancy</li> <li>○ Poorly controlled DM</li> <li>○ Immunocompromised conditions</li> <li>○ Use of Broad-spectrum antibiotics.</li> <li>○ Hormonal changes</li> <li>○ Age: 20-30 years</li> <li>○ Change in vaginal acidity.</li> <li>○ Use of corticosteroid medications.</li> <li>○ Contraceptives</li> <li>○ Sexual behaviour</li> <li>○ Tight-fitting clothing</li> <li>○ Female hygiene</li> </ul>	
<b>Clinical Presentation</b>	<ul style="list-style-type: none"> <li>○ Vulvar <b>itching</b> And Irritation</li> <li>○ <b>Pruritus</b></li> <li>○ Soreness</li> <li>○ Painful sexual intercourse (Superficial dyspareunia.)</li> <li>○ Burring on passing urine (Dysuria)</li> <li>○ <b>Fissuring</b></li> <li>○ satellite lesions.</li> <li>○ Erythema (redness)</li> <li>○ A thin and watery or thick,, small amount of <b>white (like cottage cheese/curdy)</b><sup>[1]</sup></li> <li>○ Odourless vaginal discharge.</li> </ul> 	
<b>Diagnosis of VVC</b>	<ul style="list-style-type: none"> <li>○ History &amp; symptoms</li> <li>○ physical and pelvic exam</li> <li>○ Wet prep to see clumps of <b>pseudohyphae</b>.</li> <li>○ <b>Budding yeast</b> and no pseudohyphae in patient with <i>C. Glabrata</i></li> <li>○ KOH prep helpful but not always necessary.</li> <li>○ Candidiasis can be similar to other diseases: (STD, Chlamydia, Trichomoniasis, Bacterial vaginosis, Gonorrhea)</li> </ul>  <p style="text-align: center;"><small>Yeast-wet prep</small></p>	
<b>Vaginal Yeast Cultures</b> <sup>[2]</sup> <small>Boys slides</small>	<ul style="list-style-type: none"> <li>○ Probably <b>not routinely indicated</b> as many women are colonized with <i>Candida</i> already</li> <li>○ <b>Used in recurrent infections and susceptibility testing (if patient is not responding)</b></li> <li>○ If obtained must correlate with patient signs and symptoms</li> </ul>	
<b>Types of candidal vulvovaginitis</b> <small>Girls slides</small>	<b>Uncomplicated Thrush</b>	<ul style="list-style-type: none"> <li>○ single episode/less than four episodes in a year.</li> <li>○ mild or moderate symptoms</li> <li>○ caused by the <i>Candida albicans</i> .</li> </ul>
	<b>Complicated thrush</b>	<ul style="list-style-type: none"> <li>○ four or more episodes in a year.</li> <li>○ severe symptoms.</li> <li>○ Pregnancy</li> <li>○ poorly controlled diabetes/immune deficiency.</li> <li>○ not caused by the <i>Candida albicans</i></li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>○ <b>Oral azol:</b> -<b>Fluconazol</b> (oral one tablet in single dose) -<b>Itraconazol</b></li> <li>○ Others: -Butoconazole cream -Clotrimazole( 1% cream, vaginal tablet) -Miconazole( 2% cream, vagina suppository) -Nystatin (vaginal tablet)</li> <li>○ 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.</li> <li>○ Treatment failure: In up to 20% of cases (If the symptoms do not clear within 7–14 days)</li> </ul>	

[1]: Unlike bacterial vaginosis, the discharge is **NOT** homogeneous

[2]: Also used in case of immunocompromised patients because they are usually compromised with unusual candida species (e.g chemotherapy patients)

# Trichomoniasis

<p><b>Introduction</b></p>	<ul style="list-style-type: none"> <li>○ The only parasitic infection we think is <b>Sexually-transmitted parasites</b>.</li> <li>○ Trichomonas is the most prevalent <b>non-viral sexually transmitted disease (STD) agent</b>.</li> <li>○ <b>Caused by :</b> <ul style="list-style-type: none"> <li>- Trichomonas vaginalis , a <b>flagellated</b> and motile <b>protozoan parasite</b></li> </ul> </li> <li>○ <b>Transmission:</b> <ul style="list-style-type: none"> <li>- Sexual (can't exist outside human because it can't form cysts)</li> </ul> </li> </ul>
<p><b>Clinical Features</b></p>	<ul style="list-style-type: none"> <li>○ Vaginal discharge, pruritus in females, but may be asymptomatic. <ul style="list-style-type: none"> <li>- Painful urination, Painful sexual intercourse, <b>Vulvar irritation (strawberry)</b></li> </ul> </li> <li>★ A malodorous smelling yellow-<b>green</b> to gray, sometimes <b>Abnormal vaginal odor (frothy)</b>, vaginal discharge.</li> <li>○ Males usually <b>asymptomatic</b> , but can cause <b>Non-gonococcal urethritis</b>. So men can be <b>vector</b> for the infection</li> <li>○ Copious foamy discharge, PH&gt;4.5</li> </ul>
<p><b>Complications</b></p> <p>Boys slides</p>	<ul style="list-style-type: none"> <li>○ <b>Premature rupture</b> of membranes (in pregnancy)</li> <li>○ Preterm labor and birth</li> <li>○ Low birth weight</li> <li>○ Increased transmission of other <b>STDs</b> including HIV <b>Mainly in africa</b></li> </ul>
<p><b>Confirm the Diagnosis</b></p> <p><b>Prof: remember the Gram stain</b></p>	<ul style="list-style-type: none"> <li>★ <b>Gram stain: we diagnose it based on: <u>flagella size (we see flagellated protozoa)</u>.</b></li> <li>○ Trichomonas-<b>Wet mount</b> preparation <sup>(1)</sup></li> <li>○ Trichomonas-Pap Smear</li> <li>○ <b>Culture</b> <sup>(2)</sup>: <b>Culture is considered the gold standard for the diagnosis of trichomoniasis.</b> Its disadvantages include cost and prolonged time before diagnosis, and it requires a special media</li> <li>○ <b>EIA (ELISA)</b> <ul style="list-style-type: none"> <li>- Sensitivity 91.6%</li> <li>- Specificity 97.7%</li> </ul> </li> <li>○ <b>DNA Probe</b></li> </ul> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">  <p><b>Trichomonas wet prep</b> - It is tear like parasite</p> </div> <div style="width: 30%;">  <p><b>Culture</b> -you can see the flagella</p> </div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">  </div> <div style="width: 30%;">  <p><b>Trichomonas-pap smear</b></p> </div> </div>
<p><b>Treatment</b></p>	<ul style="list-style-type: none"> <li>○ <b>Metronidazole (500 mg bid for 7 days or 2g daily for 3-5 days)</b></li> <li>○ Treat sexual partners</li> <li>○ If Rx failure: <ul style="list-style-type: none"> <li>- Consultation with experts</li> <li>- Susceptibility testing</li> <li>- Higher dose of metronidazole</li> <li>- Alternative Tinidazole</li> </ul> </li> </ul>

[1]: Placing the specimen of vaginal discharge on a glass slide and mixing with a salt solution to see the motility of the parasite. It should be done immediately or you will lose the motility

[2]: Culture is the gold standard for diagnosis but we don't usually do it because it takes time and clinical diagnosis and wet mount are more than enough

# Bacterial Vaginosis

## Bacterial Vaginosis

- Bacterial Vaginosis is a **floral imbalance**<sup>[1]</sup>.
- ↓ **Lactobacillus acidophilus** ↑ other normal flora
- **Most common of vaginal syndrome**
- Very high numbers of bacteria such as: **vaginal normal flora**:.
  - Lactobacillus acidophilus.
  - Gardnerella vaginalis.
  - Mycoplasma hominis.
  - Mobiluncus species.
  - Anaerobes:
    - Bacteroides (Porphyromonas).      - Prevotella.
    - Peptostreptococcus.                      - Fusobacterium.
- In contrast, Lactobacillus bacteria are in very low numbers or completely absent.

## BV Sequelae

Boys slides

### OB Complication

- Preterm delivery
- Premature rupture of membranes
- Amniotic fluid infection
- Chorioamnionitis
- Postpartum endometritis
- Premature labor
- Low birth weight

### GYN Complication

- Pelvic inflammatory disease (PID)
- Portaportal pelvic inflammatory disease
- Post hysterectomy infections
- Mucopurulent cervicitis
- Endometritis
- **infertility**
- **Increased risk of HIV/STD**

[1]: Usually the overgrowth of Gardnerella vaginalis, which is normally found in small amounts

[2]: Because the infected/inflamed mucosa will be full of Langerhans cells and macrophages which are HIV reservoirs.



# Bacterial Vaginosis

## Clinical Features

- **Minimal Itching and burning Or irritation**
- ★ **Fishy-smelling** Due to **alkaline semen** (specially after sexual intercourse and menses)
- Thin, Homogenous **grey or milkywhite or vaginal discharge.**
- Most cases (50-75%)
- Malodorous vaginal discharge, PH > 4.5
- Dysuria and dyspareunia rare.
- **Pruritus and inflammation are absent. (Absence of inflammation is the basis of the term "vaginosis" rather than vaginitis)**

## Etiology

Unclear, associated with associated with Gardnerella vaginalis mobiluncus, Prevotella sp.,

## Girls slides only

## Epidemiology

- **Bacterial Vaginosis is 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.**

**Note:** Although sexual activity is a risk factor for the infection, **bacterial vaginosis can occur in women who have never had vaginal intercourse.**

## Girls slides only

## Pathogenesis

Marked **reduction** in **lactobacillus** → Decreased hydrogen peroxide production → Polymicrobial superficial infection: **overgrowth of G. vaginalis and anaerobic bacteria** → After **metronidazole** treatment: Lactobacilli predominate again.

## Diagnostic Methods

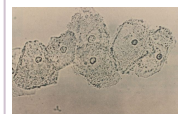
- Related **symptoms and sexual history.**
- Examination of introitus may reveal erythema of the vulva and edema of the labia.
- Speculum examination.
- A sample of the vaginal swab.
- Culture has a poor predictive value for G. vaginalis as it is prevalent in healthy asymptomatic women.
- DNA probes are expensive, and have a poor predictive value alone.

### Office Diagnostics for Vaginitis

- Empiric diagnoses often inaccurate and lead to incorrect treatment and management.
- Need for rapid, accurate and inexpensive diagnostic tests.
- Simple, inexpensive, office-based tests were underutilized:
  - Microscopy - PH measurement<sup>(1)</sup> - Whiff amine test<sup>(2)</sup>

### Clinical Diagnosis of BV

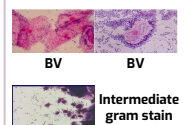
- **Clinical diagnosis. 3 out of 4 of these criteria.**
  - PH greater than 4.5
  - Positive Whiff test
  - Any clue cells
  - Homogeneous discharge (**grey or milkywhite**)



Clue cell wet mount

### Gram Stain Diagnosis<sup>(3)</sup> "Gold standard"

- ★ Predominance of lactobacilli<sup>(4)</sup> = normal
- ★ **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.**



BV BV

Intermediate gram stain


[1]: not specific for bacterial vaginosis as pH can be affected by fungal infections too

[2]: good test but not specific

[3]: Prof: I want you to remember Gram stain + Lactobacillus.

[4]: lactobacillus is protective against vaginosis, so if it was predominant, the score or likelihood of vaginosis is zero)

# Bacterial Vaginosis

Diagnostic Methods cont.	
PH Test	<ul style="list-style-type: none"> <li>PH indicator strips: pH 3.5 - 7.0</li> <li>Place sample of vaginal secretion on test strip: read while still moist.</li> <li><b>PH&gt;4.5 indicates abnormality</b> (i.e. BV-Trichomonas- or menstrual blood).</li> <li>Be careful not to sample the cervix; cervical secretions and blood have a PH 7.0</li> <li><b>Sensitivity: 87% And Specificity: 92%.</b></li> </ul>
KOH "WHIFF" Test	<ul style="list-style-type: none"> <li>Sample of vaginal secretions are placed in a test tube with 10% KOH.</li> <li>KOH alkalizes amines produced by anaerobic bacteria-results in a sharp <b>"fishy odor"</b></li> </ul>
Wet Mount Preparation	<ul style="list-style-type: none"> <li>Vaginal secretion sample from the anterior fornix and lateral wall</li> <li>Place swab in test tube with small amount of normal saline and place sample on glass slide with cover slip</li> <li>Visualize at both low and high power</li> <li>Clue cells, yeast, Trichomonas, WBC, bacteria.</li> </ul>  <p>Normal-wet mount</p>
Treatment	
<p><b>Oral:</b></p> <ul style="list-style-type: none"> <li><b>Metronidazole</b> (500 mg bid x 7 days (\$5):84-96% cure rate. &gt; Single dose therapy (2g) may be less effective.)</li> <li>Clindamycin 300 mg bid x 7 days (\$28): Less effective.</li> <li>Tinidazole</li> </ul> <p><b>Topical</b> (higher recurrence rates):</p> <ul style="list-style-type: none"> <li>Metronidazole (gel (0.75%) 5 g PV qhs x 5 days (\$30); 70-80% cure rate.)</li> <li>Clindamycin (cream (2%) 5 g PV qhs x 7 days (\$31): Less effective. May lead to Clindamycin resistant anaerobic bacteria.)</li> </ul>	

## Microbiology of Gynecological examinations **Girls slides**

Specimens obtained during Gynecological examination	
Vaginal secretions	<ul style="list-style-type: none"> <li>PH.</li> <li>Saline wet preparation.</li> <li>KOH wet preparation</li> </ul>
Cervical cultural and non cultural <sup>1</sup>	<ul style="list-style-type: none"> <li>GC.</li> <li>C.trachomatis.</li> </ul>
Vaginal culture	<ul style="list-style-type: none"> <li>Candida</li> <li>Trichomonas vaginalis.</li> </ul>
Cervical cytological examination if not documented within previous 12 months	
Specific Tests	
Routine Bacterial Cultures ARE NOT HELPFUL	
Wet mount (60% sensitive for Trichomoniasis & BV)	<b>Wet mount with yeast &amp; Trichomonas cultures:</b> Recommended tests to diagnose vaginitis.
	<b>Wet mount, without yeast or Trichomonas cultures:</b> 50% of either of these agents of vaginitis will be missed.
(KOH) "Whiff test"	Presence of abnormal or foul odor.
Gram stain	Using the Nugent scoring system, Useful to diagnose BV.
Sensitive DNA probe assay <sup>2</sup>	Combines the detection of yeasts, Trichomonas, and G. vaginalis as a marker for BV.

# Summary

	Candida Vaginitis	Trichomonas Vaginalis	Bacterial Vaginosis
<b>PH</b>	< 4.5	> 4.5	> 4.5
<b>Sign and symptoms</b>	<ul style="list-style-type: none"> <li>- Inflammation</li> <li>- Vulval itching and erythema</li> <li>- White discharge</li> <li>- Odorless</li> </ul>	<ul style="list-style-type: none"> <li>- Inflammation</li> <li>- Vulvar irritation and erythema</li> <li>- Yellow or greenish in color</li> <li>- Foul smelling discharge</li> </ul>	<ul style="list-style-type: none"> <li>- No inflammation and pruritus</li> <li>- No or minimal itching or irritation</li> <li>- Grey discharge</li> <li>- Fishy odor</li> </ul>
<b>Whiff test<sup>1</sup></b>	-	+ -	+ + +
<b>Gram stain / Wet prep</b>	Yeast and pseudohyphae	Trichomonas <small>culture is the gold standard method for diagnosis but it's not usually used because it takes time and clinical diagnosis and wet mount are more than enough</small>	<ul style="list-style-type: none"> <li>- Gram stain: Clue cells</li> <li>- Gram stain is gold standard</li> </ul>
<b>Culture</b>	Candida <small>appear as creamy white colonies on SDA</small>	Motile trophozoites	Not helpful
<b>Immunologic / Molecular test</b>	DNA probe <sup>2</sup>	<ul style="list-style-type: none"> <li>- DNA probe<sup>2</sup></li> <li>- EIA (enzyme immunoassays - 438 team)</li> </ul>	DNA probe <sup>2</sup>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>- Fluconazole</li> <li>- Nystatin</li> </ul>	Oral metronidazole	Oral metronidazole

1. 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"

2. A technique for identifying a segment of DNA, using a known sequence of nucleotide bases from a DNA strand to detect a complementary sequence in the sample by means of base pairing.

### 1- Candidal vulvovaginitis:

- Infection of the vagina's mucous membranes by yeast.
- **Risk factors:**
  - Antibiotics → kill normal flora → yeast overgrowth.
  - Pregnancy
  - Poorly controlled diabetes
  - Immunodeficiency
- **Symptoms:**
  - **White (cheese-like) odourless vaginal discharge.**
- **Types:**
  - Uncomplicated:
    - Single episode or less than 4 episodes in a year.
    - Caused by candida albicans
  - Complicated:
    - 4 or more episodes in a year.
    - Not caused by c.albicans
    - Associated with pregnancy/ poorly controlled diabetes/immune deficiency.
- **Diagnosis:**
  - Gram stain: we will see pseudohyphae yeast
  - Wet mount: we will see pseudohyphae yeast
  - Culture: helpful in cases of recurrent infection
- **Treatment:**
  - Mainly Fluconazole

### 2- Trichomoniasis (vaginitis)

- Sexually transmitted parasitic infection caused by Flagellate protozoa (T. vaginalis.)
- **Symptoms:**
  - **Yellow or greenish vaginal discharge**
  - Vulvar irritation (strawberry/reddish)
- **Diagnosis:**
  - Culture (takes time & requires special media): Motile trophozoites
  - Wet mount (quick): We can see corkscrew motility
  - Gram stain
- **Treatment:**
  - Drug of choice: Metronidazole (effective against anaerobes and some parasitic infections)
  - Sexual partner has to be treated as well.

### 3- Bacterial Vaginosis: (not vaginitis)

- A disease caused by floral imbalance: Marked reduction in **lactobacillus** & overgrowth of **G. vaginalis**, Mobiluncus species and anaerobic bacteria. (Normally lactobacillus is the dominant bacterial flora in vagina)
- Risk factors: (Although sexual activity is a risk factor for the infection, bacterial vaginosis can occur in women who have never had vaginal intercourse)
  - Multiple or new sexual partners
  - Smoking & Use of IUD
  - Older age
- **Symptoms:**
  - **Fishy vaginal discharge, greyish in color**
  - Pruritus and inflammation are absent
- **Diagnosis:**
  - Gram stain (gold standard): look for **clue cells (bacteria-coated epithelial cells.)**
  - Wet mount: look for **clue cells**
  - Vaginal pH >4.5 (will be high in trichomoniasis as well, but unchanged in candida)
- **Treatment:**
  - Drug of choice: oral or topical **Metronidazole**
  - Or clindamycin

# Quiz

## MCQ

**Q1: what is the normal PH of the vagina?**

- A- 2-3
- B- 3.8-4.5
- C- 5-6
- D- 6-7

**Q2: adiabetic patient with enlargement and redness of vagina with burning in passing urine , which of the following you may see ?**

- A- Gram -cocci
- B- Yeast with pseudohypae
- C- Trichomoniasis
- D- prevotella species

**Q3: which of the following is the best method to diagnose bacterial vaginosis ?**

- A- serology
- B- Culture
- C- Gram stain
- D- PCR

**Q4: 28 year old female presented with vulvar irritation and yellow greenish vaginal discharge. What is the most suitable treatment?**

- A- broad spectrum antibiotics
- B- metronidazole
- C- fluconazole
- D- nystatin

**Q5: Which of the following is the most prevalent microorganism in the vagina that may also be protective?(438 team)**

- A- alpha- hemolytic streptococci
- B- S. epidermidis
- C- lactobacillus
- D- E.coli

**Q6: which of the following vaginal discharges indicate bacterial vaginosis?**

- A- milky white discharge
- B- yellow discharge
- C- greenish discharge
- D- White (cheese-like) discharge

Answers: Q1:B | Q2:B | Q3:C| Q4:B | Q5: C| Q6:A

## SAQ

**CASE: A 50 year-old diabetic female presents to family physician complaining of vaginal discharge and itching. The discharge was whitish in consistency (Cheese-like). -Khalifa 438**

**Q1: What's the most likely diagnosis?**

Candidal vulvovaginitis

**Q2: How to diagnose it ?**

Wet mount, gram stain, culture

**Q3: What are the main risk factors ?**

Pregnancy, diabetes, antibiotics

**Q4: What's the appropriate treatment ?**

Mainly fluconazol or nystatin

# Quiz

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## SAQ

**CASE: A 60 year-old female presents to family physician complaining of discomfort and vaginal discharge, greyish in color with fishy like odor. The physician took a swab and a sent it to the lab to do gram stain, Clue cells were found. -Khalifa 438**

**Q1: What's the most likely diagnosis?**

Bacterial Vaginosis

**Q2: What's the appropriate treatment ?**

Metronidazole (oral or topical)

**CASE: A 30 year-old sexually active female, a new partner recently, and had an unprotected sexual activity. Presents to family physician complaining of Greenish vaginal discharge. -Khalifa 438**

**Q1: What's the most likely diagnosis?**

Trichomoniasis (vaginitis)

**Q2: What will we see if the physician ordered a wet mount of vaginal discharge?**

Motile parasite (Trichomonas)

**Q3: What's the appropriate treatment ?**

Metronidazole

# Members Board

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