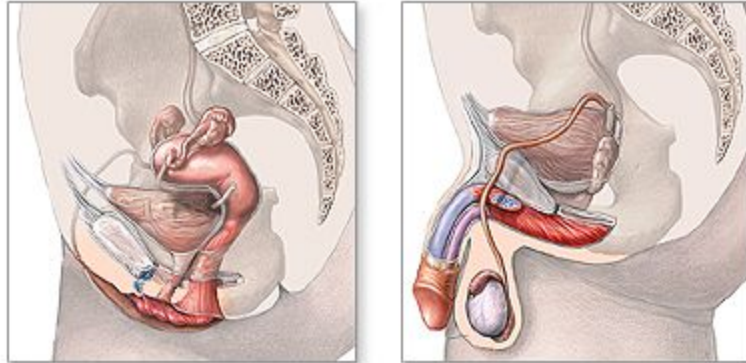


1- Vaginitis

Bacterial vaginosis, Candidiasis & Trichomoniasis.

Microbiology 435's Teamwork
Reproductive Block



إِنَّا كُلُّ شَيْءٍ خَلَقْتَهُ بِقَدْرِ ٤٩

- Information found only in girls' slides are in grey
- Information only found in boys' slides are in purple
- **Information common for both are in black**
- Footnotes are extra
- Make sure to check out the summary

- Important
- Males notes
- Females notes
- Females' slides only
- Males' slides only

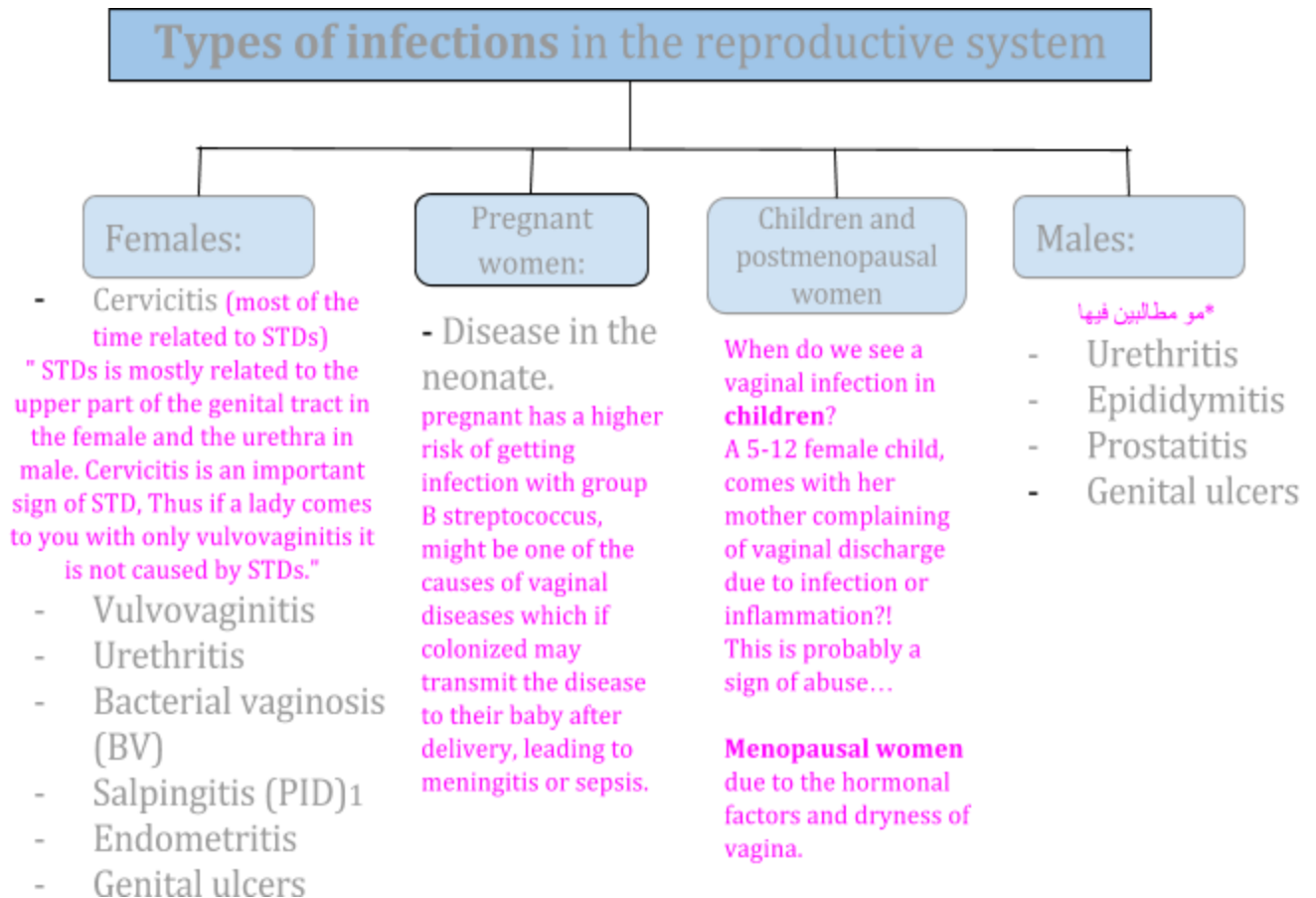
Revised by
خولة العماري & هشام الغنيلي

Resources: 435 females & males slides, wikipedia, Lippincott's Illustrated Reviews:
Microbiology- Third Edition
Editing file: [Here](#)
Credit: [Team members](#)

Introduction to Vaginitis

Terminology and Pathogenesis:

- **Vulvovaginitis, vulvitis, and vaginitis:** Are general terms that refer to the inflammation of the vagina and/or vulva.
- Vaginitis is very similar to cases of UTI especially the lower type, making it difficult to differentiate between them " فيه تداخل بينهم ". Although the urethra is a UT organ, it also has role in STDs. (The most common cause of UTI is E.coli.)
- **Vaginosis/Vaginitis** is the **most common** reason for patient visit to OB/GYN.
- Changes in the vaginal **acidity** or disturbance of **normal bacteria** in the vagina may predispose to an infection.



***Most of these are complication of STD. But the closest to vaginitis is bacterial vaginosis and vulvovaginitis.**
The urethra is lined by epithelial cells and there are a lot of organisms that have a unique ability to cause infections in the epithelial cell lining of the urethra " بشكل محدد " thus causing specifically urethritis.

ليه هذا الكائن الحي يبسبب فقط urethritis وما يسبب شيء ثاني ؟ " هذا السؤال مهم يا جماعة ."

An example of an STD that cause urethritis is **Neisseria gonorrhoeae**. It produces pus, dysuria and discharge. Easily diagnosed particularly in the male.

Neisseria gonorrhoeae likes to go and affect the epithelial lining of everything, the eyes, urethra, in female can progress to asymptomatic cervicitis and others.. but why it doesn't cause cystitis, while *E. coli* can?

E.coli has fimbriae, these fimbriae mediate the ability to **ascend** from the urethra and **attach** strongly to resist the washing effect of urine. On the other hand, *N.gonorrhoeae* mostly have **no fimbriae** + very **sensitive** that it can't antagonise the antiseptic nature of the urine and other anti-inflammatory mediator found there.

The organisms that cause STD are very sensitive and they need a close contact to cause the infection (like HIV).

¹ **Pelvic inflammatory disease (PID)** is an infection of the upper part of the female reproductive system. Signs and symptoms, when present may include lower abdominal pain, vaginal discharge, fever, burning with urination, pain with sex, or irregular menstruation.

Causes of vulvovaginitis

| | |
|-------------------------------|---|
| Bacterial | The most common cause of vaginitis is Bacterial vaginosis (40%) . It is a disease of imbalance of existing floras "like lactobacilli": in overgrowth it ferment the lactose producing acid which in turn will lower the pH and making the vagina acidic, thus precipitating some infections. Sometime related to hormones which if it was normal will help in the maintaining the normal count of lactobacilli ~> normal pH~> no infections |
| Fungal | Candida vulvovaginitis (25%) yeast , very common and important cause and we see it frequently. it might be from the existing normal flora or from the partner through STDs. sometimes is resistant |
| Parasitic | Trichomonal vulvovaginitis (25%) They are amebic and motile " لما يختبرون الإفرازات يلقون الاميبا تتحرك قدامهم ويشخصونها بسهولة " |
| Low estrogen levels | Called "atrophic vaginitis" |
| Contact vulvovaginitis | Allergic or irritation or injury response from spermicidal products, condoms, soaps, and bubble bath |

Characteristics of the Vagina and Cervix in Women of Reproductive Age

| | Vagina | Cervix |
|--------------------------------|---|---|
| pH | <4.5 | 7.0 |
| Epithelial cells | Squamous (25 layers) | Columnar |
| Pathogens/ Syndrome | <ul style="list-style-type: none"> ● Bacterial vaginosis ● Candida species ● Trichomonas vaginalis | <ul style="list-style-type: none"> ● Neisseria gonorrhoeae (GC) ● Chlamydia trachomatis |

Diagnosis of vaginitis:

1. Related symptoms and sexual history:

| General gynecological history: | General medical history: |
|---|--|
| <ul style="list-style-type: none"> ● Age ● Neonatal history ● Prepubescent history ● Postmenopausal atrophy: Onset / Estrogen depletion ● Menstrual history ● Pregnancy ● Sexual history & relationship ● Contraception ● Prior infection | <ul style="list-style-type: none"> ● Health condition: → Allergies - DM - Malignancies - Immunodeficiency ● Medication: → OCP², steroids, douches ● Symptoms: → Discharge (quality/scanty) → Odor → Valvular discomfort (in HSV) → Dyspareunia (painful sexual intercourse) → Dysuria (burning on passing urine) → Abdominal pain (in trichomoniasis & PID) |

² Oral contraceptive pills

2. Examination:

- **Breast examination:** the most important in general, although it is not related to vaginitis
- Adequate illumination & Magnification if possible. Give a patient mirror
- Inspect external genitalia for Lesions/Erythema
- Inspect Vaginal mucosa for Erythema/Lesion & Secretion
- Examination of cervix for Ectropion³/Lesions/Erythema/ Endocervical secretion
- Collect cervical and vaginal specimen. Vaginal swab sample
- Bimanual and Speculum examination. [Read](#)
- Examination of introitus may reveal **erythema of the vulva** and **edema of the labia**.

3. Office based tests.

Empiric diagnoses are often inaccurate and lead to incorrect management. Need for rapid, accurate and inexpensive diagnostic tests. simple, inexpensive, **office-based tests** were underutilized. These are:

| Office-based tests: | |
|--------------------------------|---|
| Gram Stain | <ul style="list-style-type: none">● Predominance of lactobacilli on microscopy = normal. |
| pH test | <ul style="list-style-type: none">● 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. |
| WHIFF test (KOH wet): | <ul style="list-style-type: none">● Sample of vaginal secretions are placed in a test tube with 10% KOH.● Helpful in diagnosing bacterial vaginosis (anaerobes) . |
| Saline / Wet mount preparation | <ul style="list-style-type: none">● 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 for Clue cells, yeast, trichomonas, WBC, bacteria.● Wet mount is a very easy type of examination which doesn't need staining, only put the discharge with drops of saline and then examine it.● 60% sensitive for Trichomoniasis and Bacterial Vaginosis. |
| Culture | <ul style="list-style-type: none">● A wet mount + a yeast culture and Trichomonas culture is recommended to diagnose vaginitis. However, if only a wet mount is performed, without yeast or Trichomonas culture, 50% of either of these agents of vaginitis will be missed.● Routine bacterial cultures are <u>not helpful</u>. |
| Others | <ul style="list-style-type: none">● Cervical cytological examination if not documented within previous 12 months (pap smear)● A sensitive DNA probe assay is available. It combines the detection of yeasts, Trichomonas, and G. vaginalis (as a marker for BV) |

³ Cervical ectropion (or cervical eversion) is a condition in which the central (endocervical) columnar epithelium protrudes out through the external os of the cervix and onto the vaginal portion of the cervix, undergoes squamous metaplasia, and transforms to stratified squamous epithelium.

Normal genital microbiota:

الموضوع وما فيه إن كلهم موجودات لكن لما تختلف تراكيزهم الطبيعية راح يسببون لي أنواع مختلفة من العدوى على حسب من زاد ومن نقص

- **Lactobacilli**^{4 5}
- *Corynebacterium* spp.⁶
- **Gardnerella vaginalis**⁷ (normally found in small quantity, and a sign of bacterial vaginosis if it overgrows the lactobacilli. Its levels increase in the abnormal discharge)
- *Staphylococcus aureus* and coagulase-negative staphylococci
- *Streptococcus agalactiae* (group B streptococcus is a cause of vaginitis in female, arthritis in pregnant female, and neonatal infections)
- *Enterococcus* spp.⁸
- *Escherichia coli*⁹
- Anaerobes
- Yeasts

| Classifications of vulvovaginitis (especially for candidiasis) | | |
|--|---|--|
| | Uncomplicated | Complicated |
| Case *Age is also a factor | <ul style="list-style-type: none"> ● Sporadic (single episode/less than 4 episodes in a year) ● No underlying disease ● By <i>Candida albican</i> ● Not pregnant ● Mild to moderate severity | <ul style="list-style-type: none"> ● Recurrent infection 4 or more per year (even if it was <i>C. albicans</i>) ● Underlying illness (HIV, DM) ● Non albican candida and non candida ● Pregnancy ● Severe symptoms of infection |
| Diagnosis | No culture | <ul style="list-style-type: none"> ● Culture confirmation is mandatory ● Antifungal susceptibility Testing |
| Treatment | <ul style="list-style-type: none"> ● Any available topical agent ● Fluconazole 150mg as a single oral dose | <ul style="list-style-type: none"> ● Treat for <u>10-14 days</u> with vaginal or oral agent ● Other topical agents: <ul style="list-style-type: none"> ○ Boric acid ○ 5 fluorocytocine ● Consider treatment of the partners ● Long term suppressive treatment for frequently recurrent diseases |

⁴ **Lactobacillus** is a genus of **Gram-positive, facultative anaerobic or microaerophilic, rod-shaped, non-spore-forming bacteria**. Lactobacillus or cytolytic vaginitis is one of the most under-diagnosed types of vaginitis. There is frequently a white discharge that may be mistaken for a yeast infection. Itching, irritation and burning of the vagina and vulva are frequent complaints. It is most often present during the 2 weeks before the onset of the menstrual period. Lactobacillus is one of the normal microorganisms found in the vagina, along with yeast. An imbalance in the vagina can result in overgrowth of this microorganism. The diagnosis is made by examination of the discharge under the microscope. Treatment is a baking soda douche once or twice daily which can provide external relief of symptoms. You should also avoid external sources of lactobacilli such as yogurt, discontinue medication to treat yeast, and use non-deodorized pads during your menstrual period.

⁵ (note that lactobacilli predominate the normal vagina, but predominance doesn't mean overgrowth. Normal predominance is protective against infections, however, Overgrowth of lactobacilli itself more than its normal level would induce lactobacillus vaginitis)

⁶ **Corynebacterium** is gram-positive and aerobic. They are bacilli, and in some phases of life they are, club-shaped.

⁷ **Gardnerella** is a genus of **Gram-variable-staining facultative anaerobic**, Small nonspore-forming, nonmotile **coccobacilli**.

⁸ **Enterococcus** is a large genus of lactic acid bacteria of the phylum Firmicutes. Enterococci are Gram-positive cocci that often occur in pairs (diplococci) or short chains, and are difficult to distinguish from streptococci on physical characteristics alone.

⁹ **Escherichia coli** is a gram-negative, facultatively anaerobic, rod-shaped, coliform bacterium

vaginal secretion

*the main complain that women come with is " I have a discharge". we have both normal and abnormal vaginal discharge.

| Characteristics of normal secretion | Causes of Abnormal vaginal secretion |
|---|--|
| <ul style="list-style-type: none"> ● Related to menstruation. ● Transparent. Not whitish, not yellowish. ● Contains desquamated vaginal epithelial cell ● Lactobacilli dominate ● pH= 3.5 to 4.6 ● Odorless ● No itching or irritation ● Deont soil underclothing (related to female hygiene) | <ul style="list-style-type: none"> ● Three primary vaginal infections in order of prevalence: <ol style="list-style-type: none"> 1. Bacterial vaginosis 2. Candidiasis 3. Trichomoniasis. ● Desquamative inflammatory vaginitis¹⁰ ● Cervicitis (Infectious / Noninfectious) ● Estrogen deficiency |

1- Bacterial Vaginosis:

Bacterial Vaginosis (BV):

| | |
|--|---|
| Overview | <ul style="list-style-type: none"> ● Most common cause of vaginal infection in women of childbearing age (29%) ● Caused by imbalance of normal vaginal flora: <ul style="list-style-type: none"> ○ Very high numbers of bacteria such as <i>Gardnerella vaginalis</i>, <i>Mycoplasma hominis</i>¹¹, <i>Mobiluncus species</i>¹², <i>Bacteroides</i>¹³ ○ In contrast, Lactobacillus bacteria are in very low numbers or completely absent. |
| Pathogenesis: Graph (for your info.) | <ul style="list-style-type: none"> - <i>Lactobacilli</i> normally compete with other microorganisms for adherence to epithelial cells. - They also produce antimicrobial compounds such as organic acids (which lower the vaginal pH =resistance), hydrogen peroxide, and bacteriocin-like substances. <p style="margin-left: 20px;">Marked reduction in lactobacillus (e.g. Lactobacillus acidophilus)</p> <p style="margin-left: 40px;">→ Leads to decreased hydrogen peroxide production & other defensive mechanisms provided by Lactobacilli.</p> <p style="margin-left: 40px;">→ Polymicrobial superficial infection: overgrowth of:</p> <ul style="list-style-type: none"> ● <i>Gardnerella vaginalis</i>, <i>Mycoplasma hominis</i>¹⁴, <i>Mobiluncus species</i>¹⁵, ● <i>Bacteroides</i>¹⁶ (genus: <i>Porphyromonas</i>), <i>Peptostreptococcus</i>, <i>Fusobacterium</i> and <i>Prevotella</i>. |

¹⁰ The condition is characterized by yellow or greenish-yellow vaginal discharge, often accompanied by pain with intercourse and vulvar irritation. Desquamative inflammatory vaginitis is not a sexually transmitted infection. [More](#)

¹¹ **Mycoplasmas** are the smallest free-living organisms known. They have no cell wall and therefore do not Gram stain.

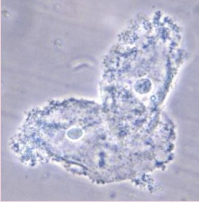
¹² **Mobiluncus** is a genus of Gram-negative, anaerobic, rod-shaped bacteria.

¹³ **Bacteroides** is a genus of Gram-negative, obligate anaerobic, nonendospore-forming bacilli.

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¹⁶ **Bacteroides** is a genus of Gram-negative, obligate anaerobic, nonendospore-forming bacilli.

| | |
|---|--|
| | <p>*most of these organisms are anaerobic. Anaerobes produce a large amount of fatty acids which have odor. MNM that might help: bacteria in the garden fused at 2 p.m.</p> |
| <p>Risk factors</p> | <ul style="list-style-type: none"> Multiple or new sexual partners (sexual activity may alter vaginal pH) Early age of first sexual intercourse. <ul style="list-style-type: none"> *Although sexual activity is a risk factor, BV can occur in women who have never had vaginal intercourse. Douching Cigarette smoking Use of IUD (intrauterine devices for contraception) |
| <p>Clinical Features:</p> | <ul style="list-style-type: none"> Most cases (50-75%) show vaginal discharge that is homogenous thin, milky-white or gray, and Fishy-smelling (the malodor is a characteristic for BV, specially after sexual intercourse and during menstruation). <ul style="list-style-type: none"> *BV it doesn't have that much of symptoms except the discharge Dysuria and dyspareunia rare Pruritus and inflammation are absent (Absence of inflammation is the basis of the term "vaginosis" rather than vaginitis) Minimal itching, burning or irritation if the patient is coming with itching and redness you will think primarily of Candidiasis rather than BV |
| <p>Diagnosis</p>  <p>= clue cells</p> | <ul style="list-style-type: none"> Clinical/Microscopic Criteria. Clinical diagnosis requires at least 3 of the following four criteria: → Gram Stain is the Gold Standard Using the Nugent scoring system¹⁷ (mixed small gram-positive & gram-negative rods ± curved rods = BV) <ul style="list-style-type: none"> * Know the concept just in case (Picture) Saline wet mount of vaginal discharge showing Clue cells (on >20% cells) is the most reliable single indicator. Clue cells form when bacteria adhere to epithelial cells in a high pH medium (more than 4.5) Positive Whiff test: KOH alkalizes amines produced by anaerobic bacteria, resulting in a sharp "fishy odor". Elevated pH and increased amine - Sensitivity 87%; Specificity 92% Culture is of poor predictive value for G. vaginalis, as it is also prevalent in healthy asymptomatic women. DNA probes are expensive and of poor predictive value alone <div data-bbox="1027 947 1544 1276" style="border: 2px solid purple; padding: 5px;"> <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 5px;">3 out of 4</p> <ul style="list-style-type: none"> 1- PH greater than 4.5 2- Positive Whiff test 3- Any clue cells 4- Homogenous discharge. </div> |
| <p>Treatment recommendations</p> | <ul style="list-style-type: none"> Oral treatments: <ul style="list-style-type: none"> Oral metronidazole 500 mg bid x 7 days (\$5) <ul style="list-style-type: none"> 84-96% cure rate Single dose therapy (2g) may be less effective |


¹⁷ The Nugent score is calculated by assessing for the presence of large Gram-positive rods (Lactobacillus morphotypes), small Gram-variable rods (Gardnerella vaginalis morphotypes), and curved Gram-variable rods (Mobiluncus spp. morphotypes).. A score of 7 to 10 is consistent with bacterial vaginosis.

| | <ul style="list-style-type: none"> ■ <i>Lactobacilli</i> re-predominate after metronidazole treatment (a sign of responding to the treatment) ○ Oral Clindamycin 300 mg bid x 7 days (\$28) - Less effective ● Topical treatments (have higher recurrence rates): <ul style="list-style-type: none"> ○ Metronidazole gel (0.75%) 5 g PV qhs x 5 days (\$30) <ul style="list-style-type: none"> ■ 70-80% cure rate ○ Clindamycin cream (2%) 5 g PV qhs x 7 days (\$31) - Less effective <ul style="list-style-type: none"> ■ May lead to <u>Clindamycin resistant anaerobic bacteria</u> | | | | |
|--|--|-----------------|------------------|--|--|
| Sequelae | <table border="1"> <thead> <tr> <th>OB complication</th> <th>GYN Complication</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> ● Preterm delivery/ Premature labor/ Premature rupture of membranes ● Amniotic fluid infection ● Chorioamnionitis ● Postpartum endometritis ● Low birth weight </td> <td> <ul style="list-style-type: none"> ● Pelvic inflammatory disease (PID) ● Postabortal pelvic inflammatory disease ● Post-hysterectomy infections ● Mucopurulent cervicitis ● Endometritis ● Increased risk of HIV/STD </td> </tr> </tbody> </table> | OB complication | GYN Complication | <ul style="list-style-type: none"> ● Preterm delivery/ Premature labor/ Premature rupture of membranes ● Amniotic fluid infection ● Chorioamnionitis ● Postpartum endometritis ● Low birth weight | <ul style="list-style-type: none"> ● Pelvic inflammatory disease (PID) ● Postabortal pelvic inflammatory disease ● Post-hysterectomy infections ● Mucopurulent cervicitis ● Endometritis ● Increased risk of HIV/STD |
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2- candidiasis

| Candidiasis/ yeast infection/ moniliasis | |
|--|---|
| Overview | <p>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.</p> <p>It is a Common superficial infection of skin and mucosal membranes by <i>Candida</i> causing local inflammation and discomfort.</p> <p>E.g. candida vulvovaginitis (vaginal thrush): Infection of the vagina's mucous membranes by <i>Candida albicans</i>. Caused by overgrowth of a normal inhabitant (i.e. candida is found naturally in the vagina) in 75% of adult women.¹⁸ *candida is one of the existing normal flora, it could increase abnormally due to many factors</p> |
| Predisposing factors: | <p>If it happens once it's ok, but if recurrent we should think of antifungal resistance. The same here we have complicated and uncomplicated cases: See page 4 above</p> <p>Pregnancy - Poorly controlled DM - Immunocompromised conditions - antibiotics- Hormonal changes - 20-30 years (childbearing age) - Contraceptives - Change in vaginal acidity - Broad-spectrum antibiotics - Use of corticosteroid medications - Sexual behaviour - Tight-fitting clothing - Female hygiene</p> |

¹⁸ *Candida* is a normal body flora found in the **skin, mouth, vagina, and intestines**. Infections occur when competing bacterial flora are eliminated, for example, by antibacterial antibiotics, allowing the yeast to overgrow.

| | |
|--|--|
| <p>Clinical Presentation:</p>  <p>*cottage cheese= candida</p> | <ul style="list-style-type: none"> ● Vulval <u>itching</u>/pruritus, soreness and irritation ● Superficial dyspareunia. ● Dysuria (candida can also cause UTI so it hard to distinguish the case) ● Odourless (unlike BV' anaerobes), thin and watery or thick and white milky creamy (cottage cheese-like) vaginal discharge ● Erythema (redness) and satellite lesions (like rash) ● Fissuring |
| <p>Diagnosis:</p> | <ul style="list-style-type: none"> ● History & symptoms: Differential diagnosis-Candidiasis can be similar to other diseases: <ul style="list-style-type: none"> ○ Sexually transmitted diseases (<u>Chlamydia/ Gonorrhoea</u>) similar symptoms, but they cause mainly cervicitis rather than vaginitis. ○ Other causes of vaginitis (Trichomoniasis/ Bacterial vaginosis) ● Physical and pelvic exam ● Wet prep to see clumps of pseudohyphae. Or Budding yeast and no pseudohyphae in patients with C glabrata. ● KOH prep helpful but not always necessary ● Vaginal Yeast Cultures: <ul style="list-style-type: none"> ○ Probably not routinely indicated, as many women are colonized with Candida. ○ If obtained must correlate with patient signs and symptoms ○ <u>For recurrent infections</u>, culture and susceptibility testing may be helpful |
| <p>Treatment</p> | <ul style="list-style-type: none"> ● Short-course topical formulations <ul style="list-style-type: none"> ○ single dose and regimens of 1–3 days ○ effectively treat uncomplicated candidal vulvovaginitis <ul style="list-style-type: none"> ■ Butoconazole cream ■ Clotrimazole (1% cream or vaginal tablet) ■ Miconazole (as a 2% cream, or vagina suppository) ■ Nystatin most commonly used (vaginal tablet, mostly as cream) ○ Topical azole drugs are more effective than nystatin ○ Azole drugs relieve symptoms in 80%–90% of cases. ● Fluconazole (oral, one tablet in single dose, in case of recurrence or resistance) ● There may be Treatment failure In up to 20% of cases <ul style="list-style-type: none"> ○ Failure = If the symptoms do not clear within <u>7–14 days</u> |

3- Trichomoniasis

| Trichomoniasis ¹⁹ (sexually-transmitted infection) | |
|---|--|
| Transmission | Trichomonas is the most prevalent non-viral* sexually transmitted disease (STD) agent ²⁰ . it is a trophozoite , amoebic, parasite, motile and you can see the flagella - Don't confuse trichomonas with Chlamydia trachomatis (Gram-negative bacterium) |
| Symptoms/ Clinical Features  | Females may be asymptomatic. If symptomatic, symptoms include: <ul style="list-style-type: none"> ● Purulent Vaginal discharge, yellow-green to gray in color, Malodorous smelling, and sometimes frothy. ● Pruritus and Vulvar irritation. Strawberry cervix²¹. ● Painful urination (Dysuria) & Painful sexual intercourse (Dyspareunia) Males: usually asymptomatic, but can cause Non-gonococcal urethritis . |
| Complications | <ul style="list-style-type: none"> ● Premature rupture of membranes ● Preterm labor and birth ● Low birth weight ● Increased transmission of other STDs including HIV |
| Diagnosis: | <ul style="list-style-type: none"> ● Wet mount Prep - fast results, but 30% miss²² ● Gram Stain ● Culture is considered the gold standard for the diagnosis of trichomoniasis. Its disadvantages include cost and prolonged time before diagnosis, used rarely. ● Other Methods of Diagnosis: <ul style="list-style-type: none"> ○ EIA (Sensitivity 91.6% , Specificity 97.7%) ○ DNA Probe ○ Pap Smear |
| Management | <ul style="list-style-type: none"> ● Confirm the diagnosis (Wet preparation - Culture - Gram Stain) ● Confirm all current sexual partners treated ● Oral metronidazole (500 mg bid for 7 days or 2 g daily for 3-5 days) ● If Rx failure -Consultation with experts <ul style="list-style-type: none"> ○ Susceptibility testing ○ Higher dose of metronidazole ○ Alternative Tinidazole |

¹⁹ The trichomonads are pear-shaped flagellates, with undulating membranes. There is no cyst form in the life cycle of Trichomonas.

²⁰ Because the optimum pH for growth of this organism is about 6.0, Abnormal alkalinity of the vagina, therefore, favors acquisition of the disease.

²¹ the cervix has a punctate and papilliform appearance, selectively associated with Trichomonas infections.

²² Scan the entire slide for motile Trichomonas. The flagella or undulating membrane should be visible. If the concentration of parasites is too low to be observed directly, laboratory culture can be used to obtain observable organisms.

L1: SUMMARY OF VAGINITIS

- **Vulvovaginitis, vulvitis, and vaginitis** → Are general terms that refer to the inflammation of the vagina and/or vulva.
 - **Normal flora of vagina** → *Lactobacilli* predominance.
 - **Predisposing factors:** Changes in the vaginal acidity or normal bacteria may predispose to an infection. As in pregnancy, DM, Immunocompromised conditions, antibiotics...
- **Causes of vulvovaginitis:**

| | Bacterial vaginosis (40%) | Candida vulvovaginitis (25%) | Trichomoniasis (25%) |
|-------------------|---|--|--|
| Clinical Features | - minimal Itching and burning - no Pruritus & inflammation - rare Dyspareunia & Dysuria | - Irritation, pruritus, soreness. - satellite lesions & erythema - Dyspareunia & Dysuria | - may be asymptomatic . - Pruritus, strawberry cervix - Dyspareunia & Dysuria |
| Etiology | <i>Gardnerella vaginalis</i> <i>Mycoplasma hominis</i> . <i>Bacteroides species</i> <i>Mobiluncus species</i> . <i>Prevotella species</i> . | <i>Candida albicans</i> 80-90%. <i>C. Glabrata</i> . <i>C. tropicalis</i> | <i>Trichomonas vaginalis</i> - Sexually transmitted parasite - The most prevalent non-viral sexually transmitted disease (STD) agent. |
| Vaginal discharge | - Thin, Milky (white or grey) - Malodorous Fishy smelling: (specially after sexual intercourse and menses). | - Thick, curdy, white (like cottage cheese) - Odorless | - Purulent yellow-green to gray, sometimes frothy . - Malodorous smelling |
| Diagnosis | * Gram Stain → Gold Standard * 3 out of 4 of these criteria: 1. PH greater than 4.5 2. Fishy odor. (+ve Whiff test) 3. Any clue cells in Wet Mount 4. Homogenous discharge - Culture is not helpful. | - Wet prep to see clumps of pseudohyphae . or Budding yeast and no pseudohyphae in patients with <i>C glabrata</i> . - KOH prep helpful but not always necessary. - pH < 4.5 (=normal) | * Culture → gold standard Its disadvantages include cost & prolonged time before diagnosis. - pH > 4.5 Note: wet mount & culture (yeast + Trichomonas) = diagnose vaginitis |
| Treatment | - Metronidazole , Tinidazole - Clindamycin is less effective - Topical: higher recurrence rate | - Oral azoles (Fluconazole, Itraconazole) - Topical azoles and nystatin | - Metronidazole . - Alternative Tinidazole. ★ Treat sexual partners |

summary

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

Complications

| Bacterial vaginosis | | Trichomoniasis |
|--|--|---|
| OB complication | GYN Complication | |
| <ul style="list-style-type: none"> ● Preterm delivery/ Premature labor/ Premature rupture of membranes ● Amniotic fluid infection ● Chorioamnionitis ● Postpartum endometritis ● Low birth weight | <ul style="list-style-type: none"> ● Pelvic inflammatory disease (PID) ● Postabortal pelvic inflammatory disease ● Post-hysterectomy infections ● Mucopurulent cervicitis ● Endometritis ● Increased risk of HIV/STD | <ul style="list-style-type: none"> ● Premature rupture of membranes ● Preterm labor and birth ● Low birth weight ● Increased transmission of other STDs including HIV |

1: A 21-year-old female presented with frothy greenish vaginal discharge. A wet mount prep showed flagellated microorganism. Which ONE of the following is the most likely diagnosis?

- A: Trichomonas infection
- B: Candida albican infection
- C: Bacterial vaginosis
- D: Chlamydia Trachomatis infection

2: What's the most common cause of vaginal syndrome ?

- A: Trichomonas
- B: Gardnerella vaginosis
- C: Candidiasis
- D: None

3: Which of the following tests is best to diagnose Bacterial vaginosis?

- A: Culture
- B: Gram stain
- C: PCR
- D: Immunohistochemistry

4: Which of the following treatment is recommended in case of Bacterial vaginosis?

- A: Gentamycin
- B: Fluconazole
- C: Metronidazole
- D: All

5: A women come to ER with dysuria and dyspareunia and satellite lesions. Testing showed clumps of normal floral pseudohyphae, what test was used?

- A: Wet preparation
- B: Gold standard cultures
- C: ELISA

6: Diabetic female came to OB/GYN clinic complaining from pruritus and cheese -like vaginal discharge. Which ONE of the following is used as a treatment?

- A. Gentamicin
- B. Ciprofloxacin
- C. Doxycyclin
- D. Boric acid

ANS :

A - B - B - C - A - D

