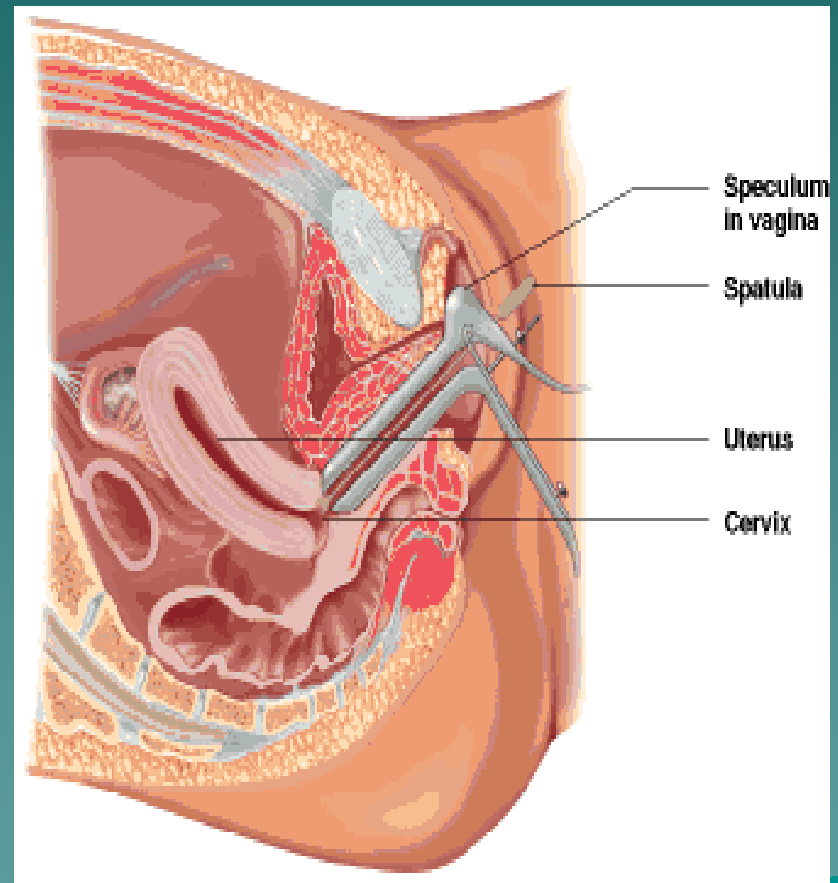


Vaginal Discharge

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Introduction

- ◆ It is musculomembranous open through the introitus at the medial vulval vestibule. It lies between the urinary bladder(anterior) and the rectum(posterior)
- ◆ *the uterine cervix, around which the vagina is attached, protrudes into its upper portion and divides it into four fornices, anterior, posterior and two lateral.
- ◆ *the size of vagina is variable and it can accommodate a baby during labour
- ◆ - Length* Anterior wall 10-7.5 cm
- ◆ * Posterior wall 12.5 cm
- ◆ *At rest the anterior and posterior walls become in contact with each other and on cross section the cavity is represented as a slit shaped somewhat like H.
- ◆ *The wide diameter of the vagina is the transverse, but at the vestibule it is the antero-posterior.



Change of vagina with age

- ◆ The vagina is covered by stratified squamous epithelium, its thickness and the amount of glycogen content in the cells depends on the circulating estrogen
- ◆ *In neonate: some of the maternal estrogen is carried over into the fetal circulation. This stimulates the growth of the vaginal epithelium and causes glycogen deposits to appear in the epithelial cells so that adult type epithelium present when the child is born. This persists for 5 days then gradually the epithelium become thin layer with no glycogen
- ◆ *In prepubertal girls: Vaginal epithelium consists of inactive layer 3-4 cell deep, with no glycogen inside the cells.
- ◆ *with onset of puberty: the 3 layers are promptly established and glycogen appears (basal, intermediate and superfascial layers) this persists throughout the reproductive years
- ◆ *After menopause: The vaginal epithelium returns to the prepubertal state with no glycogen and a basal layer of 3-4 cell deep.

pH and Doderlein Bacilli

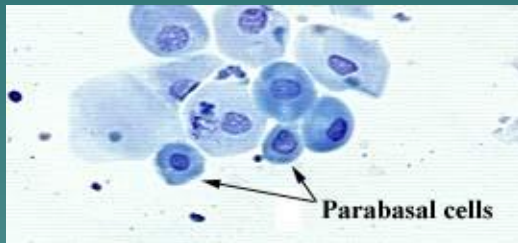
- ◆ *At birth vagina is sterile and the pH reaction of the secretion is acidic, however, in several days Doderlein bacilli appear and the degree of acidity is increased to a pH of 4-5, chiefly by lactic acid, most of which is derived by the action of bacilli on glycogen in the vaginal epithelium.
- ◆ *After one month the lactobacilli disappear, a mixed flora replace them and the pH rises to 7. The secretion remains neutral or alkaline till puberty.
- ◆ *At puberty with appearance of glycogen in the epithelial cells and formation of lactic acid by the action of lactobacilli the pH become acidic 3.8-4.2 till menopause when it return to the prepubertal pH.
- ◆ -Estrogen is the main stimulus for growth and glycogen formation within epithelial cells.
- ◆ Under estrogenic effect glucose enters the epithelial cells where it is transformed into glycogen. Lactobacilli causes breakdown of glycogen into glucose with release of lactic acid
- ◆ *the acidity of vaginal secretion inhibits growth of most pathogens except Fungi
- ◆ *pH is elevated in:
 - prepubertal and after menopause
 - after sexual intercourse
 - vaginal infections
 - conditions with excessive cervical secretion

Vaginal Cytology

- ◆ Cyclic changes of the vaginal epithelium are under control of the ovarian hormones. 3 layers of cells present:
- ◆ -1basal -2 Intermediate -3 Superficial
- ◆ *Estrogen increases the mitotic activity and number of basal layer
- ◆ *Intermediate cells appear as a growth of basal layer and characterized by development of granular cells containing more darkly stained nuclei.
- ◆ *Superficial cells . with continuous estrogen effect the intermediate layer become large and thin with small densely staining nuclei
- ◆ *Progesterone has an opposite effect and during menstrual phase the intermediate and superficial layers are shed.

Vaginal cells

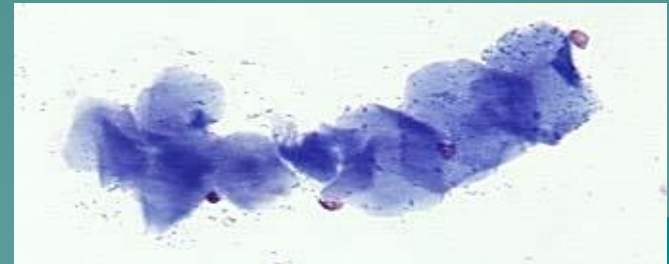
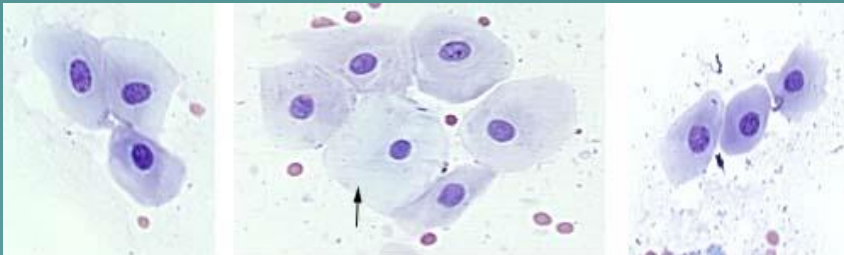
◆ Parabasal



◆ superficial



◆ intermediate



Characteristics of Normal vaginal Discharge

- ◆ Physiologic vaginal discharge consists of cervical and vaginal secretions, epithelial cells and lactobacilli flora.
- ◆ The normal pH is 3.8-4.2
- ◆ The physiological discharge is usually white, odorless and does not cause itching, burning or other discomfort. The amount changes with the days of menstrual cycle, become excessive, clear, stretchable with ferning character near ovulation.
- ◆ Normal Vaginal Flora
 - ◆ -Lactobacillus (Doderlein bacilli) aerobic gram positive rod, the most common
 - ◆ -Other bacterial flora include streptococci, staphylococci, diphtheroids, Gardnerella vaginalis and several anaerobic organisms
 - ◆ -Candida and mycoplasma specious are commonly found

Vaginitis

- ◆ Vaginitis (infection of the vagina) is the most common gynecologic condition encountered by physicians in the office. The most common causes of vaginitis are
 - ◆ **bacterial vaginosis** .
 - ◆ Vaginal **candidiasis**
 - ◆ **Trichomonas vaginalis** infection,
 - ◆ **Frequency:**
 - ◆ . The reported rate at general gynecologic clinics is 5-15%.
 - ◆ For STD clinic reported rates range from 32% to as high as 64%.

Causes

- ◆ **Bacterial Vaginosis (BV), vaginal candidiasis, and Trichomonas vaginalis infection are thought to cause approximately 90% of all vaginal infections .**
- ◆ **BV is the most common cause of vaginitis, accounting for 50% of**
- ◆ **BV is caused by an overgrowth of organisms such as Gardnerella vaginalis (gram-variable coccobacillus) , Mycoplasma hominis, and Peptostreptococcus species.**
- ◆ **Risk factors** include
 - pregnancy,
 - intrauterine device (IUD) use, and
 - frequent douching

Causes

- ◆ **Candida species** (C albicans, C tropicalis, and C glabrata) are airborne fungi that are natural inhabitants of the vagina in as many as 50% of women,
- ◆ vaginal candidiasis is the second most common cause of vaginitis
- ◆ **Risk factors include**
 - ◆ -1oral contraceptive use,
 - ◆ 2- IUD use
 - ◆ 3- young age at first intercourse
 - ◆ 4- increased frequency of intercourse
 - ◆ 5-diabetes
 - ◆ 6-HIV or other immunocompromised states,
 - ◆ 7-chronic antibiotic use, and
 - ◆ 8-pregnancy.

Causes

- ◆ **T vaginalis infection**, the third most common cause of vaginitis, is
 - ◆ caused by trichomonads. These organisms are flagellated protozoans .
 - ◆ Trichomonads primarily infect vaginal epithelium, and they less commonly infect the endocervix, urethra, and Bartholin and Skene glands . .
 - ◆ Trichomonads are transmitted sexually and can be identified in as many as 80% of male partners of infected women .
- ◆ **Risk factors include**
 - ◆ 1-tobacco use,
 - ◆ 2-unprotected intercourse with multiple sexual partners, and
 - ◆ 3-the use of an IUD.

Complications

- ◆ Recurrent vaginal infections can lead to chronic irritation, excoriation, and scarring .These, in turn, can lead to sexual dysfunction .
- ◆ Psychosocial and emotional stresses are not uncommon .
- ◆ chronic vaginal infection can facilitate the transmission of other STDs, including HIV .
- ◆ Complications of BV include
- ◆ *endometritis* ,pelvic inflammatory disease (PID), * vaginal wound infections after gynecologic surgeries .
- ◆ In pregnancy, Trichomonas infection and BV are associated with increased risk of:
 - premature rupture of the membranes,-
 - preterm labor, and preterm delivery .

Diagnosis

- ◆ Patients with vaginitis almost always present with a chief complaint of abnormal vaginal discharge
- ◆ A carefully documented history is essential in the diagnosis of vaginitis . .
- ◆ Ascertain the following attributes of the discharge:
 - *Quantity* Duration* Color* Consistency
 - *Odor

Symptoms

- ◆ **Bacterial vaginosis:** This is characterized by thin, homogenous, malodorous white-to-grey vaginal discharge and pruritus. Vaginal pain or vulvar irritation is uncommon.
- ◆ **Vaginal candidiasis:** Pruritus is the most common symptom of vaginal candidiasis. This is accompanied by thick, odorless, white vaginal discharge (with an appearance similar to cottage cheese) that can be minimal. Usually, associated vulvar candidiasis is present, commonly with vulvar burning, dyspareunia, and vulvar dysuria (burning sensation when urine comes into contact with vulva skin).
- ◆ **T vaginalis infection:** Many patients (20-50%) are asymptomatic. Symptoms include profuse vaginal discharge that can be white, gray, yellow, or green. The yellow and green colors are due to the presence of WBCs.
Dysuria (20%), pruritus (25%), and postcoital bleeding due to cervicitis are other possible symptoms.

Signs

- ◆ **Bacterial vaginosis:** BV discharges are frothy and white to grey. The discharge appears adherent to the vaginal mucosa. As many as 50% of women with BV are asymptomatic.
- ◆ **For diagnosis of BV, 3 out of the following 4 criteria must be present:**
 - ◆ 1- Homogenous, white, adherent discharge
 - ◆ 2-Vaginal pH higher than 4.5
 - ◆ 3-Release of fishy odor from vaginal discharge with potassium hydroxide
 - ◆ 4-Clue cells on wet mount
- ◆ **Vaginal candidiasis**
 - Erythema and swelling of the labia and vulva with satellite lesions
 - Discrete pustulopapular lesions
 - Vaginal erythema with adherent thick, cottage cheese-like vaginal discharge (the cervix usually appears normal)

Signs

- ◆ **T vaginalis infection**

The vulva may appear erythematous and edematous, with excoriation.


- ◆ Look for homogenous vaginal discharge that can be white, gray, yellow, or green

- ◆ Small punctate cervical and vaginal hemorrhages with ulcerations may be observed

"Strawberry cervix" or "colpitis macularis" is very specific for *Trichomonas* infection, and 2-5% of patients will have this finding on examination.

- ◆ Diagnosis of *Trichomonas* infection based on clinical signs and symptoms is unreliable, so laboratory confirmation is mandatory.

Work Up

- ◆ Saline wet mount
 - ◆ Potassium Hydroxide test
 - ◆ Vaginal pH
 - ◆ Cultures
- 
- A stylized, dark teal silhouette of a mountain range is located in the bottom right corner of the slide, adding a decorative element to the background.

Saline wet mount

- ◆ Vaginal discharge is placed on a slide with 1-2 drops of 0.9% isotonic sodium chloride solution and examined under high power (x400)
- ◆ **Bacterial vaginosis:** Saline wet mount is 60% sensitive and 98% specific
Clue cells are vaginal epithelial cells covered with many vaginal rods and cocci bacteria, creating a stippled or granular appearance. A decreased number of lactobacilli is observed, and WBCs are absent.
- ◆ **Vaginal candidiasis:** Hyphae and budding yeast forms are noted.
- ◆ **T vaginalis infection:** Saline wet mount is 80-90% sensitive in symptomatic women. T vaginalis is an oval- or fusiform-shaped protozoan that is 15 mm long (size of a leukocyte), with erratic, twitching motility. A large number of WBCs and epithelial cells are observed.

Potassium Hydroxide preparation

Vaginal discharge is placed on a slide with 10% KOH solution.
Known as the **whiff test**.

positive finding is the release of a fishy odor after addition of 10% KOH to discharge.

The odor is due to the release of amines such as putrescine, cadaverine, histamine, and trimethylamine.

- ◆ **Bacterial vaginosis:** Whiff test is one of the most specific tests for BV and the least sensitive.
- ◆ **Vaginal candidiasis:** Negative whiff test is 65%-85% sensitive for candidal infection.
- ◆ **Trichomonas vaginitis:** Whiff test may be positive.

Vaginal pH

- ◆ **Vaginal pH** can be determined with litmus paper .
- ◆ A pH greater than 4.5 often is found in patients with Trichomonas infection or BV (84-97% sensitive, 57-78% specific)
- ◆ Recent intercourse, douching, cervical mucus, and blood can lead to false-positive results.
- ◆ **Bacterial vaginosis: pH is 5.0-6.0.**
- ◆ **Vaginal candidiasis: pH is less than 4.5.**
- ◆ **T vaginalis infection: pH is 5.0-7.0.**

Cultures

- ◆ **Cultures have little utility for diagnosing BV.** Gram stain is 89-97% sensitive and 79-85% specific for detecting BV.
- ◆ **Cultures with Nickerson or Sabouraud mediums** should be performed in refractory or recurrent cases of **vaginal candidiasis**.
- ◆ **Culture using Diamond medium** is the criterion standard for detection of **trichomonads** and should be used when infection is suspected but cannot be confirmed by other means

Treatment

◆ T vaginalis infection

- ◆ **Because trichomonads often infect the urethra and the Skene and Bartholin glands, systemic chemotherapy is recommended**
- ◆ **Metronidazole (Flagyl)** is the treatment of choice both for patients who are immunocompetent and for those who are immunocompromised.
- ◆ **Adult Dose 2 g PO as a single dose or 500 mg PO bid for 7 d**
- ◆ **Topical treatment with nonoxynol-9 and povidone-iodine** douches has been shown to be effective in treating T vaginalis infection in women unable to use metronidazole .



Treatment

- ◆ **Vaginal candidiasis**

- ◆ A variety of potent azole agents (oral and topical) are available .

- ◆ Azoles are fungistatic agents

e.g . Miconazole - Clotrimazole - Nystatin (Mycostatin)-

Fluconazole (Diflucan)

- ◆ Boric acid can be used in resistant cases.

Treatment

- ◆ **Bacterial vaginosis:** Metronidazole (Flagyl) and clindamycin are effective in the treatment of BV..
- ◆ **Diet :** Acidophilus supplements in the diet may help prevent vaginitis ,especially if patients are taking antibiotics
- ◆ **Activity:**
 - ◆ -Instruct patients to abstain from sexual activity and from douching until a diagnosis has been made.
 - ◆ -Patients also should abstain from unprotected sexual activity (sexual activity without proper male condom use) until the infection has been treated .

Senile Vaginitis

- ◆ Postmenopausal atrophy of the vagina renders it less resistant to trauma and infection
- ◆ Ulcerations of the thin epithelium if on opposing surfaces may result in adhesions. Early these are easily broken to separate the walls but if left, it become firm and may partially obliterate the vagina
- ◆ Trichomonas, Gardnerella, Candida and non-specific infection involve the vulnerable senile mucosa
- ◆ **Treatment**
 - ◆ In addition to specific therapy to these organisms estrogen stimulation by local cream is used
 - ◆ It is essential that estrogen be continued until the mucosal resistance is adequate and all inflammation is gone