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**GENITAL TRACT INFECTION**

**Objectives:**

Discuss the anatomy and physiology of genital tract infection.-

* -Discuss the commonest causes of GTI, their signs and symptoms.
* - To understand how to approach patients with vaginal discharge.

**GENITAL TRACT INFECTION**

Genital tract infection is one of the commonest diseases in women and mostly affects women at the age of sexual activities.

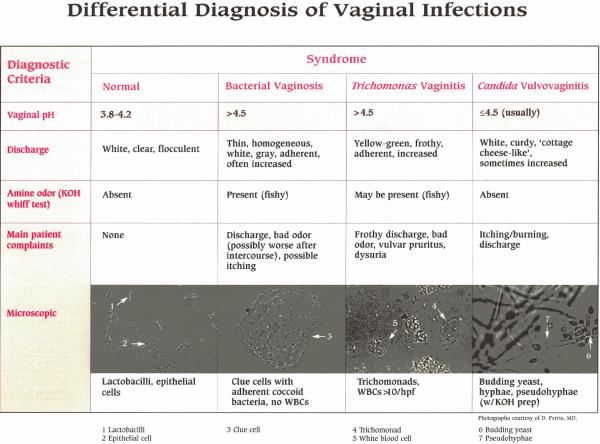
**Classification of genital tract infection:**

Depending on the site and affection of the infective organism

* 1. Lower genital tract infections: - vulvitis, vaginitis, cervicitis.
* 2. Upper genital tract infection:- (Pelvic Inflammatory Disease).
* **Vaginal discharge:**
* Causes of increased vaginal discharge:
* **1-Physiological causes:**
* -Oestrogen related –puberty, pregnancy ,COCP.
* -Cycle related- maximal mid-cycle and premenstrual.
* -Sexual excitement and intercourse.
* **2-Pathological causes:**
* - Non sexually transmitted (BV ,candida).
* -Sexually transmitted (TV,Chlamydia,gonorrhea).
* **3-Non infective causes:**
* -Foreign body.
* -Malignancy.
* -Atrophic vaginitis often bloody stain.
* -Cervical ectropion or endocervical polyp.
* -Fistula urinary or faecal fistula.
* -Allergic reaction.
* **Physiological vaginal discharge:**
* The vaginal epithelium is lined by stratified squamous epithelium during the reproductive age group under the influence of the estrogen.
* Normal vaginal secretions are composed of vulvar secretions from sebaceous, sweat,Bartholin, and Skene glands; transudate from the vaginal wall; exfoliated vaginal andcervical cells; cervical mucus; endometrial and oviductal fluids; and micro-organisms andtheir metabolic products mainly bacteria(lactobacillius). It is watery in consistency,may be white in color , and usually located in the dependent portion of the vagina (posterior fornix).
* May increase in the middle of the menstrual cyclebecause of an increase in the amount of cervical mucus. These cyclic variations do notoccur when oral contraceptives are used and ovulation does not occur. The normal vaginal flora is mostly aerobic, with an average of six different species of bacteria, the most common of which is hydrogen peroxide producing lactobacilli.
* The microbiology of the vagina is determined by factors that affect the ability of bacteria to survive . These factors include vaginal pH and the availability of glucose for bacterial metabolism. The pH level of the normal vagina is lower than 4.5, which is maintained by the production of lactic acid.

**Infective vaginal discharge:**

* Symptomatic vaginal discharge most often reflects BV, candidiasis, or trichomoniasis
* **1. Bacterial Vaginosis:**
* The commonest cause of abnormal vaginal discharge, bacterial vaginosis (BV) has been reported in 5– 50% of female worldwide. While a definitive cause is not determined, depletion of the lactobacilli dominant in the healthy vaginal flora is observed, together with an elevation of vaginal pH to above 4.5. The existence of a vaginal epithelial biofilm consisting of Gardnerella vaginalis and other species has been more recently described.
* Symptoms include an offensive vaginal discharge that is often reported as having a ‘fishy’ malodour which is particularly noticeable following coitus, and menstruation. , and on examination a homogenous off-white vaginal discharge with a high pH is observed. Diagnosis is made by evaluating a Gram stain of the vaginal discharge using a validated method, such as the Hay-Ison or Nugent criteria, or, less frequently in modern practice, by using **Amsels criteria** (3 of 4 are required:
* -A fishy vaginal odour on addition of alkali.
* - Creamy grayish white discharge and thinly coat the vaginal walls.
* - Vaginal pH is higher than 4.5.
* -The finding of both clue cells and a positive whiff test is pathognomonic, even in asymptomatic patients.
* **Aetiology and risk factors:** repeated alkalinization of the vagina is the major cause, which occur with:
* 1.frequent sexual intercourse.
* 2.early age of sexual intercourse.
* 3. sex during menses.
* 4.douching.
* 5.Intrauterine device.
* **Adveres effects:** women with BV are at increased risk for:
* **1.**Pelvic inflammatory disease (PID).
* **2.** **posthysterectomy vaginal cuff cellulitis.**
* **3.**Postabortal PID.
* **4.**Pregnant women with BV are at risk for premature rupture of the membranes preterm labor and delivery chorioamnionitis, and postcesarean endometritis .In women with BV who are undergoing surgical abortion or hysterectomy, perioperative treatment with metronidazole eliminates this increased risk.
* 5. increased risk of HIV acquisition is observed in women at risk with BV.
* -Clinicians who are unable to perform microscopy should use alternative diagnostic tests such as a pH and amines test card, detection of G. vaginalis ribosomal RNA, or Gram stain.
* -Culture of G. vaginalis is not recommended as a diagnostic tool because of its lack of specificity.
* **Treatment:**
* Ideally, treatment of BV should inhibit anaerobes but not vaginal lactobacilli.
* 1.**Metronidazole:**
* excellent activity against anaerobes, is the drug of choice, dose of 500 mg administered orally twice a day for 7 days should be used or gel, 0.75%, one applicator (5 g) intravaginally once or twice daily for 5 days, may also be prescribed.
* 2.**Clindamycin**: 300 mg, orally twice daily for 7 days, orcream, 2%, one applicator full (5 g) intravaginally at bedtime for 7 days.
* Many clinicians prefer intravaginal treatment to avoid systemic side effects such as mild to moderate gastrointestinal upset and unpleasant taste.
* Women with BV should be advised that vaginal douching or excessive genital washing should be avoided.
* Treatment of the male sexual partner does not improve therapeutic response and not recommended.
* **2.Trichomonas Vaginitis**:
* Is most common curable STD caused by flagellated parasite, (Trichomonas vaginalis) and can cause severe vulvovaginites.It is found in the vaginal ,urethral and paraurethral glands. The transmission rate is high; 70% of men contract the disease after a single exposure to an infected woman, which suggests that the rate of male-to-female transmission is even higher. It often accompanies BV, which can be diagnosed in as many as 60% of patients with trichomonas vaginitis.
* Recurrence is common if male is not treated simultaneously.
* **Signs and symptoms:**
* -Asymptomatic in 10-50% but may present with:
* -Vulval soreness and itching.
* -Foul smell vaginal discharge, sometimes frothy yellowish green in nature.
* -Dysuria, and abdominal discomfort.
* -In patients with high concentrations of organisms, a patchy vaginal erythema and (“strawberry” cervix) from punctate haemorrhage may be observed in 2%.
* - Men with trichomoniasis may feel itching or irritation inside the penis, burning after urination or ejaculation, or some discharge from the penis.
* **Diagnosis:**
* -The pH of the vaginal is usually higher than 5.0.
* -Wet mount test reveals motile trichomonads with typical flagellae or acridine orange stained slide from the post vaginal fornix (40-70% sensitivity), and increased numbers of leukocytes.
* -culture media are available and will diagnose up to 80% of cases.
* -Clue cells may be present because of the common association with BV.
* -The whiff test may be positive.
* -Morbidity associated with trichomonal vaginitis may be related to BV. Patients with trichomonas vaginitis are at increased risk for postoperative cuff cellulitis following hysterectomy.
* -Pregnant women with trichomonas vaginitis are at increase risk for premature rupture of the membranes and preterm delivery
* **Treatment:**
* - contact tracing and treatment of the partners.
* -Metronidazole is the drug of choice for treatment in a single-dose (2 g orally) and a multidose (500 mg twice daily for 7 days) regimen are highly effective and have cure rates of about 95%.
* -Tinidazole, 2 g, in a single dose of 2 g for 5 days is equally effective.
* -Treatment failure- routine administration changed (rectal rather than oral) or higher doses is given.In these uncommon refractory cases, an important part of management is to obtain cultures of the parasite to determine its susceptibility to metronidazole and tinidazole.
* **3.Vulvovaginal candidiasis:**
* Is one of the most common genital infections , is caused by [*Candida albicans*](http://www.dermnetnz.org/fungal/candida.html) in the vagina in around 80-90%.Other species of *Candida*, such as *C. glabrata* and *C. tropicalis*, can cause vulvovaginal symptoms and tend to be resistant to therapy. The vagina is colonized with Candida sp. in up to 20% of women in their reproductive years, rising to 40% in pregnancy, and is most often asymptomatic.
* Overgrowth of *Candida albicans* occurs most commonly with: Pregnancy , Higher dose COCP and oestrogen-based hormone replacement therapy, a course of broad spectrum antibiotics such as [tetracycline](http://www.dermnetnz.org/treatments/tetracycline.html) or amoxiclav, [Diabetes mellitus](http://www.dermnetnz.org/systemic/diabetes.html) ,[Iron deficiency anaemia](http://www.dermnetnz.org/systemic/iron-deficiency.html) , [Immunodeficiency](http://www.dermnetnz.org/immune/immunodeficiency.html) e.g., [HIV infection](http://www.dermnetnz.org/viral/human-immunodeficiency-virus.html).
* **Signs and Symptoms :**
* -Heavy white curd-like vaginal discharge
* -The discharge can vary from watery to homogeneously thick.
* -Vaginal soreness, dyspareunia, vulvar burning, and irritation may be present. External dysuria (“splash dysuria) may occur when micturition leads to exposure of the inflamed vulvar and vestibular epithelium to urine.
* **Examination reveals erythema**:
* edema and fissuring of the labia and vulvar skin. Discrete pustulopapular peripheral lesions may be present. The vagina may be erythematous with an adherent, whitish plaques adherent to the vaginal wall. The cervix appears normal.
* **Classification of Vulvovaginal Candidiasis:**
* **Uncomplicated Complicated**
* Sporadic or infrequent in occurrence Recurrent symptoms
* Mild to moderate symptoms Severe symptoms
* Likely to be Candida albicans Non-albicans Candida
* Immunocompetent women Immunocompromised, e.g., diabetic women
* **Diagnosis:**
* -The pH of the vagina is usually normal (s1<4.5).
* -The results of saline preparation of the vaginal secretions usually are normal, Fungal elements, either budding yeast forms or mycelia, appear in as many as 80%of cases.
* -The whiff test is negative.
* -A fungal culture is recommended to confirm the diagnosis.
* **Treatment:**
* 1.**Topically** applied azole drugs are the most commonly available treatment for VVC, Symptoms usually resolve in 2 to 3 days *like* Clotrimazole1% cream, 5g intravaginally for 7–14 days *or* 100-mg vaginal tablet for 7 days*.*
* 2**. An oral fluconazole**, used in a single 150-mg dose have equal efficacy.
* 3. **Complicated VVC**( in pregnancy , diabetes, immunecompromizied) : an additional 150-mg dose of fluconazole given 72 hours after the first dose, or can be treated with a more prolonged topical regimen lasting 10 to 14 days. Adjunctive treatment with a weak topical steroid, such as 1%hydrocortisone cream, may be helpful in relieving some of the external irritative symptoms
* 4. **Recurrent Vulvovaginal Candidiasis**- defined as four or more episodes in a year, presents persistent irritative symptoms , Burning replaces itching as the prominent symptom in patients with RVVC.
* -Treatment with fluconazole (150 mg every 3 days for 3 doses), then maintained on a suppressive dose of fluconazole, 150 mg weekly for 6months. 90% will remain in remission.
* Other simple measures may help to decrease recurrent attacks:
* -Wearing cotton underwear.
* -Avoiding chemical irritant e.g soap and bath salts.
* -Many women with RVVC presume incorrectly they have a chronic yeast infection. Many of these patients have chronic atopic dermatitis or atrophic vulvovaginitis.



**Cervicitis :**

It is inflammation of the cervix, which can be due to irritation, infection,

injury of cells that line the cervix,these cells may become red, swollen, and ooze mucus and pus, they may also bleed easily when touched.

**Aetiology:**

1- usually caused by infections that are passed during sexual activity, Gonorrhea, Chlamydia,Genital herpes, trichomoniasis

2-Allergies to chemicals in spermicides, douches, or to the latex rubber in [condoms](http://www.webmd.com/sex/birth-control/birth-control-condoms).

3-Irritation or injury from tampons, pessaries, or from [birth control](http://www.webmd.com/sex/birth-control/) devices like diaphragms

4-Hormonal imbalance; having relatively low estrogen or high progesterone may interfere with the body's ability to maintain healthy cervical tissue.

Endocervical infection is commonly by:

**1. Neisseria gonorrhoea endocervicitis**:

It is fourth most common sexually transmitted disease, caused by Neisseria gonorrhoea, intracellular ,gram –ve diplococcus, has high affinity to infect cuboidal and columner epithelium in cervix and urethra.

**Signs and symptoms:**

-Usually asymptomatic 50% diagnosed when screening on contact tracing.

-Increased vaginal discharge with lower abdominal pain 25%.

-Dysuria with urethral discharge.

-Proctitis with rectal bleeding , duscharge , and pain.

- pharyngeal infection through receptive oral sex; the latter is nearly always asymptomatic.

-Endocervical mucopurulant discharge and contact bleeding.

- mucopurulant urethral discharge.

-Pelvic tenderness with cervical excitation.

- Ascending infection may result in PID in 10% and, rarely, haematogenous spread can cause disseminated gonococcal infection with a purpuric non-blanching rash and/or an arthralgia or arthritis that is typically monoarticular in a weight-bearing joint.

-Ophthalmic infection occurs due to inoculation from infected genital secretions.

-neonatal infection occurs when the mother has endocervical infection at the time of delivery.

**Diagnostic tests:**

-Gram staining-visualization of g-ve intracellular diplococcus( small cotton swab is placed into the endocervical canal ).

-Culture medium using agar medium containing antimicrobial to reduce growth of other organism.

-Nucleic acid amplification tests (NAAT).

- Nucleic acid hybridization tests.

**Treatment:**

Screening for other STIs is crucial, particularly for C. trachomatis, as dual infection is common. Dual treatment of uncomplicated infection is presently with a parenteral thirdgeneration cephalosporin plus azithromycin; the recent addition of azithromycin to treatment regimens is an attempt to delay the emergence of further drug resistance.

-Cefixime, 400 mg orally (single dose), or Ceftriaxone, 250 mg intramuscularly (single dose), or Ciprofloxacin, 500 mg orally (single dose).

-Contact tracing and treatment.

**2.Chlamydia trachomatis endocervicitis:**

It is one of the most common STI, with women under 25 years of age most frequently affected. Infection with C. trachomatis is often asymptomatic but can still result in subclinical PID and subsequent complications. It is caused by an obligate intracellular bacteria Chlamydia trachomatis, affecting columner epithelium of the genital tract.

There are several serovars of Chlamydia :D-k infect the GUT.

**Signs and symptoms:**

-Asymptomatic.

-Vaginal discharge and lower abdominal pain.

-Postcoital bleeding.

-Intermenstrual bleeding.

-Mucoprulant cervical discharge with contact bleeding.

-Dysuria with urethral discharge.

**Complications:**

-Pelvic inflammatory disease.

-Perihepatitis: Fitz-Hugh \_Curtis syndrome.

-Neonatal conjunctivitis, and pneumonia.

-Reiter's syndrome, reactive arthritis that is typically monoarticular affecting the weight-bearing joints may occur, but is more common in men. .

**Diagnostic tests:**

1.Nuclic acid amplification test->90% sensitive, repeated twice to improve specifity of the test.

2.Culture is expensive with limited availability, not routinely recommended.

**Treatment:**

*Azithromycin*, 1 g orally (single dose), *or Doxycycline*, 100 mg orally twice daily for 7 days, *or Ofloxacin*, 300 mg orally twice daily for 7 days.

Simultaneous treatment of current and recent sexual partners is required.

Cervicitis is commonly associated with BV, which, if not treated concurrently, leads to significant persistence of the symptoms and signs of cervicitis.