

Urogenital & Sexually transmitted Diseases

Pharmaceutical Microbiology

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Normal Microflora of the Urogenital System

- All parts of urinary system except the portion of the urethra closest to the urethral opening are sterile.
- Escherichia coli & lactobacillus are the most common m.o colonizing the outer portion of the urethra
لactobacillus + acidic PH + urea onc عنا جهاز مناعة بسبب
وهذول كلهم بيقللوا احتمالية حدوث التهاب
- Acid pH and high salt and urea concentrations retard the growth of bacteria in urine.
- In males, other than the last third of the urethra, the genital tract does not have a normal microflora and is sterile
ال females اكثر عرضة للالتهابات

Normal Microflora of the Urogenital System

In females:

- During the child-bearing years, lactobacilli are dominant in vagina feeding on glycogen present in vaginal cells. Glycogen fermentation produces lactic acid and a vaginal pH of about 4.4 innate defense, as most microbes other than lactobacilli cannot survive in this acidic environment) .
هون بيشرحلي ليش البيئة عنا acidic
بس بعد البلوغ رح تتغير هاي البيئة
- During childhood and after menopause, glycogen is absent from vaginal cells, and streptotocci and staphylococci rather than lactobacilli are the dominant organisms in those alkaline conditions.

Urinary tract infections

normal flora لو غيرنا مكانها بتعزل التهاب

- Urinary tract infections are a group of common diseases that occur predominantly by ascension of normal enteric flora through the urethra into the bladder.
- UTI causes urethritis (inflammation of urethra) & cystitis (inflammation of bladder)
- Infection spreads from urethra (in female 4cm, males 20cm) to bladder causing urethrocystitis, women affected ~50X more than men.
becoase urethre is shorter
- Sometimes infection ascends to reach kidneys & cause pyelonephritis.
Less often, infections begin in the kidneys and descend to the urethra.

الالتهاب ممكن يطلع للكلى وبعديها يوصل للدم، بس العكس نادر

Urinary tract infections

- In males the prostate gland is closely associated with the urethra and bladder, so **prostatitis, or inflammation of the prostate** gland, often accompanies UTIs.
- ***Escherichia coli* is the causative agent in 80% of UTIs**, but other enteric bacteria from feces such as *Proteus mirabilis* and *Klebsiella pneumoniae* can also cause such infections.
- **When *Chlamydia* or *Ureaplasma* are responsible for infection, they usually are sexually transmitted.**

Urinary tract infections

كثير الاعراض مهمة ، وكمان التحليل المختبري مهم

- Diagnosis is made by identifying related clinical symptoms(**dysuria** or pain and burning on urination) in combination with an abnormal urinalysis and growth on urine culture.

بالمضاد يعتمد على patient factors وعلى

مسبب الالتهاب

- UTIs are treated with antibiotics, such as amoxicillin, trimethoprim, and quinolones, or with sulfonamides according to susceptibilities of their causative agents.

مثلا اموكسيسيلين ما يعطيه لمريض عنده حساسية بنسلين،

والكوينولونز ما يعطيه للحوامل

- Prompt treatment helps prevent the **spread of infection**. UTIs can be prevented by good personal **hygiene and frequent, complete emptying of the bladder**.

i have to collect
the midstream ,
not the initial outflow
of the urine to avoid
contamination

DIAGNOSTIC TESTING FOR URINARY TRACT INFECTIONS

- For non-catheterised patients, a well taken midstream specimen of urine (MSSU) should be collected, avoiding perineal contamination, into a sterile universal container.
- Ideally samples should be processed as soon after collection as possible, to prevent bacterial overgrowth. If a delay in processing is unavoidable, samples should be refrigerated at 4C. لازم اشتغل بالعينة واحللها فوراً، او بحفظها بالتبريد

بعض كثير اشياء بالعينة :

if there is cells: WB, RB, bacteria

- **Urine microscopy is the use of a microscope to look at** urine.
- **Urine dipsticks use different chemicals reagents on a** strip that is dipped in urine to diagnose urinary tract diseases. زي اختبار تغيير اللون تبع ال pH
- **Urine culture allows identification of the organism** causing infection.

هون يعني اعمل زراعة

Risk Factors:

1- Gender (females)

2-Functional Abnormalities like
pressure on bladder
(impair urine outflow)

3-Age

4-Diabetes

5-suppression on immune system

6-instrument enhance urine outflow
(bacteria overgrowth)

CYSTITIS

- Cystitis is an infection of the bladder.
- The clinical features of lower UTI commonly include dysuria (pain on passing urine), urinary frequency, urgency and fever.

حرقة / تقطع / ألم / ارتفاع درجة الحرارة

- ***Escherichia coli* is by far the most common cause of urinary tract infections, especially cystitis.** Other enteric gram-negative rods such as *Klebsiella species* and *Proteus species* are regular culprits. *Pseudomonas aeruginosa* can cause urinary tract infection.

المسبب ممكن يكون بكتيريا او فطريات

- *Candida species* can cause infection in patients who have extensive prior antibiotic use. Rarely, viruses such as adenovirus and cytomegalovirus can cause a hemorrhagic cystitis. These viruses almost exclusively cause cystitis in immunocompromised hosts.

PYELONEPHRITIS

- Is an infection of the kidney(s).
- may occur either by **ascension of bacteria from the urethra** to the bladder and then to the kidney(s) or, less commonly, through hematogenous spread from other sites of infection.
- *Escherichia coli* is the most common pathogen causing pyelonephritis. Other enteric gram-negative rods such as **Klebsiella and Proteus species** are also involved. **Pseudomonas aeruginosa** can cause pyelonephritis

وجع بالخواصر والظهر، غثيان، ارتفاع درجة الحرارة، وباقي الاعراض اللي حكيناها قبل

PYELONEPHRITIS

- Patients with pyelonephritis typically present with fever, flank pain, nausea, and vomiting. They may or may not have signs and symptoms of lower tract infection (dysuria, frequency, hematuria, suprapubic tenderness).

وممكن يكون بالبول دم

- Treatment: Antibiotics that are able to obtain high concentrations in the **renal parenchyma** and have activity against common pathogens are required to treat pyelonephritis.
- Empiric regimens for community-onset infection include a **fluoroquinolones** (ciprofloxacin or levofloxacin) or a third generation cephalosporin such as ceftriaxone.

site of action

ممکن اعرف مسبب الالتهاب من البول او من الدم

واحيانا ما بقدر استنى التحليل وبعطي المضاد علطول

Genital infections

- **Vaginitis:** The term applies to inflammation of vaginal mucosa that may extend to the vulva and is commonly associated with a white or yellow discharge.
itching + discomfort
- **Risk Factors**
Predisposing conditions: pregnancy, diabetes, oral contraceptives, menopause, conditions that result in estrogen & progesterone imbalance will result in pH & sugar change.
- Causative agent of Vaginitis: Gardnerella vaginalis in combination with anaerobic bacteria, Candida albicans (yeast), the protozoan Trichomonas vaginalis (sexually transmitted).
- **Bacterial Vaginitis** is usually caused by opportunistic organisms from disturbance of normal flora by antibiotics or other factors.

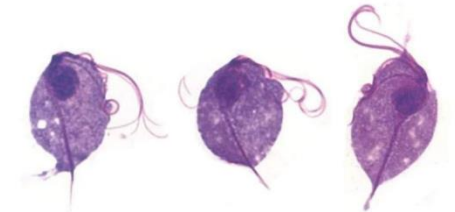
Genital infections

- **Bacterial Vaginitis**
- **Gardnerella vaginalis** : G-ve bacillus or coccobacilli
- Symptoms: **frothy, fishy-smelling vaginal discharge**, even discharge is small but contains millions of m.o.
- Treatment: **Metronidazole** (to kill the anaerobic bacteria needed for the association to produce disease), Ampicillin & tetracyclines may be used

Genital infections

- **Trichomoniasis (Trichomonas vaginitis)**-Caused by **flagellated protozoan** Trichomonas vaginalis (TV)
- Primarily is STD, **sexual transmitted disease**
- Most women with TV are believed to be asymptomatic. However, abnormal vaginal discharge, vulval and peri-anal itching are the most common symptoms.
- During pregnancy, TV can cause pre-term delivery and low birth weight
- Treatment and prevention in adults
Multiple or single dose of oral **metronidazole**; and restoration of normal vaginal pH in women

Sexual partners of women with TV need to be treated as well.



Genital infections

الالتهابات الفطرية من الالتهابات الانتهازية التي بتستغل نقص المناعة

- **Vulvo-vaginal candidiasis (VC); ('Thrush')** is caused by **Candida albicans** in the majority of cases.
- Immunosuppression (secondary to HIV, or immunosuppressive agents), diabetes mellitus, pregnancy, use of broad spectrum antibiotics can each predispose women to VC.
- **Clinical features:** Itching and irritation, vaginal discharge, ^{yellowish} dysuria are the most common complaints.
- **Treatment:** Topical azole **antifungal agents** (as pessary or creams) can be used; **clotrimazole, miconazole**; A single oral dose of **fluconazole** is an alternative

SEXUALLY TRANSMITTED DISEASES

- **Non-gonococcal urethritis and cervicitis** is caused by **Chlamydia trachomatis**.
A typical bacteria
- The majority of infected (70% of female and 50% of male) patients are **asymptomatic**.
both partners should be treated
- Untreated chlamydial infection can cause **pelvic inflammatory disease (PID)** in 10–40% of women that may result to infertility.
all parts of reproductive system
ال PID كثير خطيرة لأنها بتسبب عقم، وخطورتها بانها احيانا ما بتبين معها اعراض
- Treatment: **tetracyclines & sulfa drugs**. Chlamydia not susceptible to penicillins

SEXUALLY TRANSMITTED DISEASES

- **Gonorrhea** is caused by *Neisseria gonorrhea*
- Has Attachment *pili* (fimbriae) enable gonococci to attach to epithelial cells that line the urinary tract so that they are not swept out with the passage of urine.
- Gonococci produce an endotoxin that damages the mucosa in fallopian tubes and releases enzymes such as proteases and phospholipases that may be important in pathogenesis.
- It is killed by phagocytes but some bacteria can survive inside the leukocytes

برصه بتسبب PID

SEXUALLY TRANSMITTED DISEASES

- The urethra is the most common site of gonorrhea infections in males.
- The most common site of infection in females is the cervix. As many as half of infected females develop **pelvic inflammatory disease (PID)**.
- Disseminated infections, which occur in 1 to 3% of cases, produce bacteremia, fever, joint pain, endocarditis.
- Treatment: Most frequently used is **Cephalosporin e.g Ceftriaxone plus Azithromycin**. The reason of dual treatment is that people with N. gonorrhea are most of the time co-infected with Chlamydia trachomatis & azithromycin is effective against it. **If allergic to cephalosporins use spectinomycin**

Azithromycin: استخدمه عشان اعالج ال chlamydia

Viral Sexually Transmitted Diseases

- **Herpes simplex virus (HSV) infection.** الهيربس حسب نوعه ينتقل
- Two closely related viruses: HSV-1 (typically causes cold sores) & HSV-2 (typically causes genital herpes) cause same kind of lesions on mucous membrane of **mouth & genitals**.
- HSV results in a chronic infection that may cause recurrent episodes.
- **Initial HSV-1 or HSV-2 infection can be asymptomatic,** Most adults have antibodies to herpesviruses, but only 10 to 15% have experienced symptoms.
- In both HSV-1 and HSV-2 infections, vesicles form under keratinized cells and fill **with fluid from virus-damaged cells, particles of cell debris, and inflammatory cells.** **Vesicles are painful,** but they heal completely in 2 to 3 weeks without scarring

لازم ما لعب بالهيربس ولا اصابه
عشان جوا الحبة بكون في فايروس

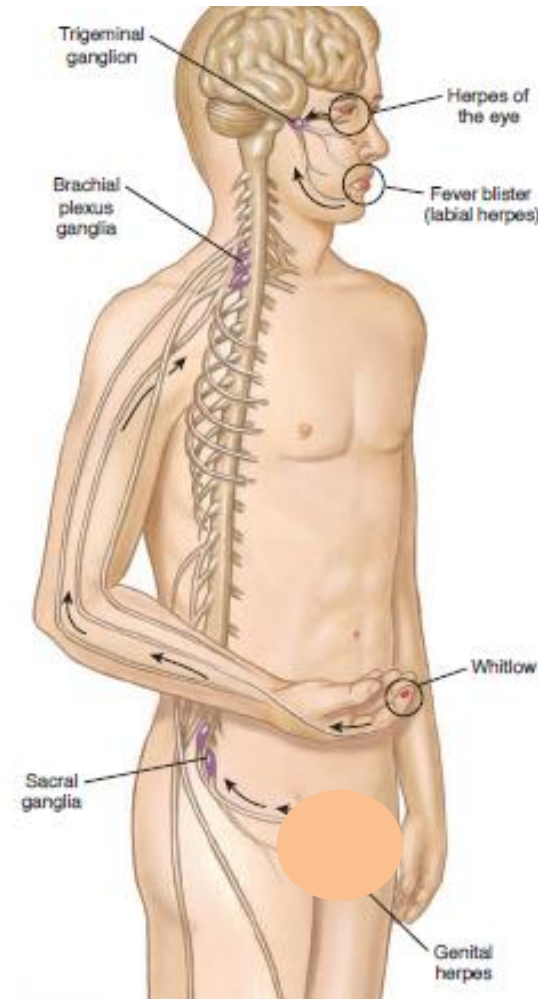
Viral Sexually Transmitted Diseases

- Herpes virus is a latent virus, within 2 wks of active infection, viruses travel via sensory neuron to ganglia where they replicate slowly or not at all.
- They can reactivate spontaneously or be activated by fever, stress, hormone imbalance, menstrual bleeding, a change in the immune system, or trauma.
مرة او مرتين او حتى خمس مرات بالسنة
- Recurrences can be limited to one or two episodes or can appear periodically for the life of the patient
- Once the virus reaches target epithelial cells and starts to replicate, antibodies can neutralize the viruses, and T cells can eliminate virus-infected cells.

Viral Sexually Transmitted Diseases

- After an occurrence of a lesion, they **migrate to ganglia**, from which they travel back to the site of the original lesion at the time of the next outbreak.
- An exception to this pattern sometimes occurs at the **trigeminal ganglion**, at which three branches of the **trigeminal (fifth cranial)** nerve join. Virus from a lesion on the lower lip could migrate out along the ophthalmic branch on a subsequent episode, causing the eye to become affected, or even migrate backward into the brain, **causing meningitis and brain damage**.

احيانا الفايروس لما يصير له reactivation رح يسبب ضرر بمكان مختلف



Viral Sexually Transmitted Diseases

- Genital herpes: causes vesicles in genitals of both males & females which are severely painful & itchy. Lesions shed viruses which are very contagious.
- Women infected with genital herpes may be subject to three other serious problems :
 - 1- the incidence of miscarriages is higher among women with genital herpes ,
اجهاض
 - 2- the infant of infected pregnant woman must be delivered by Caesarean section.
رح تولد قيصري عشان احمي الجنين من انتقال الفايروس الـ
 - 3- Finally, infected women have an increased risk of becoming infected with the AIDS virus.

ممکن یسبب ایدز

- Treatment

- HSV-DNA polymerase inhibitors (aciclovir, valaciclovir, famciclovir) used systemically are highly effective in controlling HSV episodes. These agents do not eradicate infection.
- Aciclovir is used for recurrent episodes.
- For patients with frequent HSV recurrence episodes (more than 5 episodes a year), suppressive therapy can be initiated. This includes acyclovir or valaciclovir once a day. The duration of suppressive therapy is 12 months.

sarah khader



Artery Academy