Sexually Transmitted Diseases
3rd Medical Students

Prof. Dr. Asem Shehabi
Faculty of Medicine, University of Jordan
Introduction

- The number of cases of sexually transmitted diseases (STDs), continues to increase dramatically worldwide.

- Each Year there are about 500 Million New Cases.

- STDs can lead to various genitourinary diseases.. infertility, cervical cancer, low birth weight, congenital & prenatal infections, tubal pregnancy.. other chronic conditions such as neurosyphilis, and increased risk of HIV infection.

- STDs are important because of their damaging impact on life of young adults, child bearing women and infants.
Common Bacterial & Fungal Agents of STDs

- **Neisseria gonorrhoea**: Gonorrhea
- **Chlamydia trachomatis, Mycoplasma genitalium/Ureaplasma urealyticum**... causing Nonspecific urethritis, vaginitis, salpingitis, Pelvic inflammatory disease by one or more organisms.
- **Treponema pallidum**: Syphilis
- **Haemophilus ducreyi**: Chancroid
- **Gardenella vaginatis**: Vaginoses, Mixed bacteria
- **Candida spp.**: Vaginitis
Gonorrhea

- *Neisseria gonorrhoeae* is a Gram-negative diplococci, killed rapidly outside the human host. Presence of pili & surface cell outmembrane proteins support cells attachment, infect & cause local inflammation of mucosa genital tract, throat, rectum both men and women. **Acute & chronic stages.**

- **In women**: vagina & cervix are the first infected. Infection can spread into the uterus & fallopian tubes, resulting in *Pelvic Inflammatory Disease* (PID)/endometritis and salpingitis as common complication. **Ectopic pregnancy & infertility in about 10% of infected women.**

- **New born eye**-infection is common in asymptomatic infected mother. **Ophthalmia neonatorum** causes cornea damage, blindness without treatment.
Neisseria Gram-ve diplococci
**SYMPTOMS**

- **Infection in women:** Mostly first mild without symptoms (80%). Bleeding can be associated with vaginal intercourse. Later chronic infection. Painful burning sensations during urinating, occasionally yellow or bloody purulent vaginal discharge.

- **Infection in men:** Develop mostly as acute urethritis with symptoms more often than women including: fever, burning sensations, abdominal pain. Urethral discharge/white/yellow pus with mild to severe pain. Anal infection & itching. **Incub. period 2-10 days.**

- Disseminated *N. gonorrhea* may cause epididymitis, prostatitis/orchitis & infertility. **Complications:** Rarely blood sepsis, meningitis, endocarditis, dermatitis-arthritis syndrome.
DIAGNOSIS & TREATMENT

- Direct Gram-Stain smear from urethral/vaginal discharge, presence intracellular Gram-negative diplococci resembling *Neisseria* in polymorphonuclear leukocytes.


- Antimicrobial drugs: mostly R-penicillin, Relatively Effective drugs Cefixime, Ceftriaxone, Ciprofloxacin, Doxycycline. Susceptibility test should be done.

- No immunity after infection. No vaccine is available.
**Syphilis**

- *T. pallidum* has a characteristic helical/Spiral shape.. 4-15 um.. Related to Gram-negative bacteria.. can’t demonstrated by Gram-stain.

- Treponema cell wall contains peptidoglycan layer rich in Lipids.. treponemal endoflagella are complex & enclosed within outer membrane.. motile.

- Treponema cells are very sensitive to drying, heat and disinfectant.. survive few minutes outside the human body.. Infect only human host.

- **Pathogenicity:** Hyaluronidase, high lipids enhance invasiveness , contributes to granulomatous lesions & autoimmune reaction during progressive infection.

- *T. pallidum* can’t be cultured in vitro, but it can be isolated in Rabbit testicles for research.
Morphology of Treponema
General Feature

- **Transmission**: Sexual contact, blood, body fluids with an infected person.
- Bacteria pass infected skin or mucous membranes usually of genital area, lips, mouth, anus.
- Treponema active cells penetrate and reside in epithelial cells.. multiply slowly.. 2-6 Weeks.
- **Syphilis** has so many clinical symptoms
- Presence HIV infection at the same time can change the symptoms and course of syphilis.
- **Syphilis** other than **congenital syphilis**, occurs in 3-4 stages that sometimes overlap over many years.
Primary Syphilis

- Primary syphilis is often a small, round firm, painless ulcer /chancre/ lesion. Highly infectious at the first body site infection.

- Most lesions appears on extra genitalia, vagina, but ulcers can also develop on the cervix, tongue, lips, or other parts of the body. Can be easily overlooked without symptoms. No fever.

- There is often only one ulcer. Nearby swollen lymph nodes. The ulcer usually appears about 3 weeks after infection, but it can occur any time from 9 to 90 days after exposure to infection & disappears after 4 weeks.
Secondary syphilis-2

- If primary syphilis is not treated, mostly progress to the **secondary stage**.
- Most persons with secondary syphilis have red maculopapular skin rash, including often **palms of hands and soles of feet**. Associated with moist lesions, **Candylomas** which occur in the anal or genital areas as a flat soft lesions.
- **Other common symptoms include:**
  Sore throat, fatigue, headache, swollen lymph glands. Less frequent symptoms include fever, hepatitis, meningitis, glomerulonephritis, weight loss, hair loss, lesions (cold sores) in the **mouth or genital area**.
- Most lesions of secondary syphilis contain many **active Treponema** cells. Patients is highly infectious.
Diffuse skin rash associated with Syphilis
Congenital Syphilis

- Pregnant woman with secondary syphilis may infect fetus vertically in utero during first trimester & at birth. Infection may cause miscarriage, premature babies & stillbirth.

- Few percentage of infants with congenital syphilis have symptoms at birth, but the majority develop symptoms later. After 2 years.

- Untreated babies may have facial & tooth deformities, delays in growth or seizures along with many other problems such as rash, fever, swollen liver and spleen, jaundice, anemia, including damage to their bones, teeth, eyes, ears, brain.
Latent/Tertiary Syphilis-3

- As with primary syphilis, secondary syphilis will disappear even without treatment. Infection will progress to the next hidden stages.

- **latent syphilis**: Positive blood syphilis test, often without clinical signs or symptoms, associated with low transmission of infection. Without treatment, it will progress slowly over many years to Tertiary syphilis.

- During this stage, antibodies, cell-mediated immunity, and hypersensitivity developed to Treponema antigens play a role in immunity. But not sufficient to stop the development of disease complication in each case.

- A minority of infected people develop Tertiary Syphilis.
Tertiary Syphilis is an autoimmune reaction to Treponema antigens. Which damages heart, eyes, brain, nervous system, bones, joints, almost any other part of the body by developing Gummas.

Gummatous syphilis is progressive destructive granulomatous lesions over 5-30 years. Mostly skin, bones, Liver, mucocutaneous tissues. Lesions are free of Treponema. Noninfectious. High mortality.

Neurosyphilis is meningovascular syphilis associated with degenerative CNS. Brain or spinal cord damage is one of the most severe signs of this stage. Paralysis and Death.

Cardiovascular syphilis affects heart muscles causing fatal aortic aneurysm.
Non-sexually transmitted Treponema

- **Pinta-Yaws**.. both are contagious, non-venereal infection caused by *T. pertenue, T. carateum*

- Human infection occurs mainly in children less than 15 years.. Following direct skin to skin contact with infected person.. causing depigmented skin lesions in legs, finger, face, chest, abdomen..

- The disease occurs primarily in warm, humid, tropical subtropical areas of Africa, Asia, South America.

- **Bejel** is non-venereal syphilis-like disease.. called endemic Syphilis caused by *T. endemicum*.

- Transmission.. Direct contact.. First soft oral & skin lesion in face, later may affect Nasopharynx and bones.. Diagnosis & Treatment similar to Syphilis.
Lab Diagnosis-1

- It is very difficult to diagnose syphilis based on clinical symptoms without the presence of the first genetial ulceration or skin rash.

- Symptoms and signs of the disease might be absent or be confused with those of other diseases.

- **Direct Dark Field Microscopy** can detect Treponema spiral forms and motility from fresh collected exudates-lesions

- *T. pallidum* can’t be observed in Gram-stain... Sliver-stain can be used in biopsy... No Culture in vitro
Lab Diagnosis-2

- **Serology Screening Tests**: Non-Specific tests:
  1. **VDRL** – Venereal Disease Research Laboratory.
  2. **RPR** – Rapid Plasma Reagin. Both used antigens include Cardiolipin + cholesterol + Lecithin.

- Both detect **anti-lipid IgG & IgM** in host Serum after infection 2-4 weeks. After disappear the skin lesions (Primary / Secondary Syphilis).

- Both tests become negative after antibiotic treatment and in **Tertiary Syphilis**.

- The test may give positive results with other diseases. Collagen vascular disease, Acute febrile disease, Recent bacterial vaccination.
Specific Confirmatory Tests

- **Fluorescent Treponemal Antibody Absorption** - FTA-ABS test. (Killed Treponema cells + Patients serum + Labeled antihuman gamma globulin) Detects presence of IgG & IgM in Serum & CSF. High specific and sensitive for all stages.

- **T. pallidum Microhemagglutination Assay** detects syphilis antigens. Specific and sensitive. Confirm most stages of infection.

- All tests can’t distinguish Syphilis from other non-sexually transmitted Treponema infections. Yaws & Pinta, Bejel.
Treatment & Prevention-1

- Syphilis is easy to cure in its early stages. Intravenous **Penicillin** is the best treatment for syphilis.
- **Doxycycline** can be given.. For Penicillin allergic persons.
- Always both partners should be treated
- Late syphilis.. **Cann’t be reversed**.. Untreated syphilis in women can cause miscarriages.. premature births, stillbirths, or death.. No Vaccine is available
Chlamydia trachomatis-1

- *C. trachomatis* is one of the most widespread bacterial of STDs.. About 50 Million of new cases each year worldwide..Human natural host, Genital serotypes.. Intracellular Growth, Inclusion Bodies.. Elementary bodies..infectious stage, Reticulate bodies replicate in infected mucosal tissue (inclusion bodies).

- Chlamydial infection followed vaginal/anal sexual contact with an infected partner.. Sexual Infection is more asymptomatic in women than men (70-80%).

- Chlamydia symptoms usually appear within 1 to 3 weeks.. In men, most early symptoms are mild, Few pus cells- dysuria, nonspecific urethritis.. Non-treated infection may progress slowly over years to cause epidydimitis, proctitis, proctitis & Infertility.
Chlamydia Elementary- and Reticulate bodies
C. trachomatis
- Trachoma
- Inclusion conjunctivitis
- Proctitis
- Nongonococcal urethritis
- Salpingitis
- Cervicitis
- Lymphogranuloma venereum
  (inguinal lymph nodes)

C. psittaci and C. pneumoniae
- Upper respiratory infection
- Bronchitis
- Pneumonia

Genitals
Chlamydia symptoms-2

- **In women** infection causes cervicitis, urethritis, Proctitis, endometritis, salpingitis.. pelvic inflammatory disease (PID).. Pelvic adhesion & Infertility.

- Newborn baby who is exposed to *C. trachomatis* during delivery may develop **eye infection**.. inclusion conjunctivitis.. **Ophthalmia neonatorum**.

- Symptoms of conjunctivitis, which include discharge and swollen eyelids, usually develop within the first 10 days of life.

- Complication.. Trachoma, Blindness.. Rarely cause Neonatal atypical pneumonia.

- **Adult infection inclusion conjunctivitis** due to spread from genitalia to eye by contaminated fingers.
Chlamydia

- Chlamydia is easily confused with gonorrhea in women because the symptoms of both diseases are similar and both diseases may occur together.
- **Lymphogranuloma venerum**.. *C. trachomatis*.. serotypes L1-L3.. Common in tropical countries.. Infection starts as genital ulcer with Lymphadenopathy.. spread to genitourinary and gastrointestinal tract.. causing inflammation & strictures in genital tract.
- **Treatment**: Doxycycline.. Erythromycin
- No vaccine
Chlamydia diagnosis

- **Detection Chlamydia Plasmid/DNA** in urine/cervical swabs/urethral swabs by PCR test.
- **Elementary bodies** of Chlamydia can be identified by direct smear prepared from discharge, stained with monoclonal antibodies, detected by fluorescence microscopy by **Direct immunofluorescent test**.
- The Chlamydia antigen test is a rapid test to detect the Chlamydia antigen from female cervical swab, male urethral. **MaCoy cell tissue culture** used for isolation & antibiotic susceptibility.
- **Serological test** is not significant for detection genital infection.
Other genital Infections

- **Mycoplasma genitalium/ M. hominis, Ureaplasma urealyticum**: These can be present without any symptoms in about 20% genital tract males/females. Single or more organisms may cause up to 25% cases of non-specific urethritis. Mostly *M. genitalium* in men. Mild discharge, few pus cells, burning and pain during urinating.

- **In women**, cases of mucopurulent cervicitis & PID can be associated with *M. hominis/ M. genitalium*.

- **Vaginitis**: Inflammation vagina result in discharge, itching, burning, pain due to change in the normal balance of vaginal bacteria. Reduced lactobacilli or estrogen levels after menopause. Also associated with Candida spp. or mixed infection.
- **Bacterial vaginosis (BV)**: Mixed bacteria is the most common cause of vaginitis.

- *Gardnerella vaginalis*: Part of vaginal flora may cause in association with anaerobic or other bacteria vaginosis.

- **Diagnosis**: Direct Gram-stain presence of numerous "clue cells" (cells from the vaginal lining coated with numerous gram-variable bacteria, pus cells & fishy odor. Culture urine / cervical swabs

- **Vaginitis treatment**: Doxycycline.. Erythromycin

- **Vaginosis treatment**: metronidazole or clindamycin
YEAST INFECTION

- Vaginal yeast infection, or **vulvovaginal candidiasis**, is a common cause of vaginal irritation and discharge.
- This common fungal infection occurs when there is an increase in presence of one or more *Candida albicans* or others *C. glabrata, C. tropicalis, C. krusei*.
- Although this infection is not considered an STI, 10 to 15 percent of men/women develop symptoms after sexual contact with an infected partner.
- *Candida spp.* are always present in the vagina in small numbers. Several factors are associated with increased yeast infection in women, including:
Candida albicans Pseudoahyphae
Yeast infection

- Pregnancy, using oral contraceptives, using steroid drugs/antibiotics, having uncontrolled diabetes mellitus.
- Wearing tight, poorly ventilated clothing and synthetic underwear may contribute to vaginitis.
- The most frequent symptoms of yeast infection in women are itching, burning, and irritation of the vagina. Painful urination are common.
- Vaginal discharge is not always present and may be a small amount. The thick, whitish-gray discharge is typically...it can vary from watery to thick discharge.
- Repeat occurrence vaginal candidiasis is very common.
Yeast infection- 4 Diagnosis & Treatment

- Microscopic examination of discharge/urine
  Presence of numerous yeast cells.. *Pseudohyphae*.
- Culture on Sabouraud Dextrose Agar, ChromCandida Agar, Serum Germ Tube test.
- Various antifungal vaginal drugs are available to treat yeast infections.
- Antifungal creams can be applied directly to the area.. oral or vaginal cream of fluconazole, miconazole, clotrimazole.