

Pathophysiology (Unit-5)

B. Pharma 2nd semester

★ Infectious disease :-

① Meningitis :-

An infectious disease characterized by inflammation of the protective membranes covering the brain and spinal cord (Meninges).

Types :-

- **Bacterial**: Serious, needs quick treatment.
- **Viral**: Less severe, often goes away on its own.
- **Fungal/parasitic**: Rare, often in people with weak immune system.

Symptoms :-

• Common Signs :

- Fever
- Headache
- Stiff neck
- Sensitivity to light
- Nausea/vomiting.

Diagnosis :-

- **Lumbar puncture**: Test the fluid around the brain and spinal cord.
- **Blood test**: To find the cause.
- **Imaging**: CT or MRI to check for complications.

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Treatment:-

- Bacterial: Anti biotics, Sometimes Steroids.
- Viral: Mostly Supportive Care (fluids, rest).
- Fungal: Antifungal medicines.

Prevention:-

- Vaccines: For Some bacterial types.
- Good Hygiene: Wash hands often.

② Typhoid:-

A bacterial infection Caused by water and food Contaminated with Salmonella typhimurium (S.typhi) is termed typhoid or enteric fever.

Symptoms:-

◦ Common Signs:-

- Fever (often Sustained and high)
- Weakness and fatigue
- Abdominal pain
- Headache
- Loss of appetite.
- Sometimes a rash with Small, rose Colored Spots.

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Causes:-

• Transmission:

- Spread through Contaminated food or water
- Can also be spread by contact with an infected person or carrier

Diagnosis:-

• Tests:

- Blood tests (e.g blood Culture) to identify the bacteria
- Stool or urine test may also be used.

Treatment:-

- Antibiotics: Usually effective, such as Ciprofloxacin or Azithromycin
- Hydration: Important to stay hydrated.

Prevention:-

- Vaccination: Available for high risk area
- Hygiene: Safe food and water practices, handwashing.

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③ Leprosy:-

Leprosy is a chronic infectious disease caused by the bacterium "*Mycobacterium leprae*." It primarily affects the skin, peripheral nerves, mucous membranes and eyes.

Symptoms:-

1. Skin lesions: Light-Coloured or reddish patches, decrease Sensation
2. Nerve Damage: Leads to weakness and pain in hand and feet
3. Muscle weakness: Can result in disability and deformities if untreated
4. Eye problem: May Cause vision impairment or blindness if nerve around the eyes are affected.

Diagnosis:-

- Clinical examination and skin biopsy.
- Laboratory tests, including acid-fast bacilli staining or PCR for detecting *M. leprae*.

Treatment:-

- Multi-Drug Therapy (MDT): Includes a combination of antibiotics such as dapsone, rifampin and clofazimine.

prevention:-

- Early treatment: Effective in curing the disease and preventing complications.

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④ Tuberculosis:-

Tuberculosis is a bacterial infection caused by "Mycobacterium tuberculosis". It primarily affects the lungs but can also impact other parts of the body.

Symptoms:-

1. Pulmonary TB:-

- persistent cough (sometimes with blood)
- chest pain
- fever
- night sweats
- weight loss.

2. Extrapulmonary TB:

- symptoms vary based on the affected organ (e.g. lymph nodes, kidneys, spine).

Diagnosis:-

- Skin test: Checks for a reaction to TB protein.
- Blood test: Detects immune response to TB.
- Chest x-ray: Shows lungs damage.
- Sputum test: Examine mucus from the lungs for bacteria.

Treatment:

- First-line drug: includes a combination of antibiotic like Isoniazid, rifampin, ethambutol, and pyrazinamide.

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- Duration: Typically 6 to 9 months of therapy is required to ensure Complete eradication and prevent resistance.

prevention :-

- vaccination: BCG vaccine helps protect against TB.
- Avoid Close Contact: With people who have active TB.
- Early treatment: Helps stop the spread and prevent complications.

⑤ Urinary tract infection :-

An Infection in any part of Urinary System: kidney, Ureters, bladder, or urethra.

Types:-

- Cystitis: Infection of the bladder
- Urethritis: Infection of the urethra
- Pyelonephritis: Infection of the kidney (more severe).

Symptoms:-

- Burning feeling when Urination
- Frequent urge to urinate
- pain or discomfort in the lower abdomen
- Cloudy or Strong - Smelling urine

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Causes:

- Bacteria, Most Commonly Escherichia Coli (E.coli) from the bowel.

Diagnosis:-

Urine test: Checks for bacteria and other signs of infection

Treatment:-

- Antibiotics: Medications prescribed based on the type of bacteria and its resistance.
- Hydration: Drinking plenty of fluids to help flush out bacteria.

Prevention:

- Drink lots of water
- practice good hygiene
- Urinate after sex,

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★ Sexually Transmitted disease :-

Sexually transmitted disease (STDs) are infections that spread through Sexual Contact, including Vaginal, anal or oral sex.

- They Can be Caused by bacteria, viruses, or parasites and symptoms vary widely depending on the specific infection.
- Common STDs Include Chlamydia, gonorrhea, Syphilis & HIV/AIDS, genital and HPV etc.

★ AIDS :-

- Defination: AIDS is the advanced stage of HIV (Human immunodeficiency virus) infection, characterized by a severely ~~by~~ weakened immune system, making the body vulnerable to opportunistic and certain cancers.
- HIV vs AIDS: HIV is the virus that cause the disease, while AIDS is the condition that develops if HIV is not treated. Not everyone with HIV will develop AIDS.
- Cause: Advanced stage of HIV (Human Immunodeficiency Virus) infection.

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- Transmission: Spread through Contact with Infected bodily fluids (blood, Semen, vaginal fluid, breast Milk), via unprotected Sex, needle sharing or from mother to child during birth or breastfeeding.
- Symptoms: Early HIV May be asymptomatic, advance of AIDS symptoms include Severe infections, weight loss, persistent fever, night Sweats and opportunistic infections (e.g. Pneumonia).
- Diagnosis: Detected through blood tests for HIV antibodies or antigens. AIDS is Confirmed by a CD4 Count below 200 cells/mm^3 or Specific opportunistic infections.
- Treatment: Managed with antiretroviral therapy (ART) to reduce viral load and improve quality of life. no Cure, but ART Can help prevent progression.
- prevention: Use of Condoms, regular HIV testing, pre-exposure prophylaxis and harm reduction strategies for people who inject drug.

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★ Syphilis :-

A sexually transmitted disease caused by the bacterium *Treponema pallidum* is termed Syphilis. Though it is not as common as other STIs.

- However if left untreated it can cause very serious health problems in both males and females.

• Types :-

- Primary Syphilis : Characterized by a painless sore at the site of infection, typically genital, anal or oral. The sore heals within a few weeks.
- Secondary Syphilis : Cause skin rashes, mucous membrane lesions, and flu-like symptoms.
- Latent Syphilis : No visible symptoms, but the infection remains in the body. Can last for years.
- Tertiary Syphilis : Occurs in about 15-30% of untreated cases, potentially affecting the heart, brain, and other organs, leading to serious complications like Cardiovascular syphilis or neurosyphilis.
- Transmission :- Spread through direct contact with syphilitic sores during vaginal, anal, or oral sex. Can also be transmitted from an infected mother to her baby during pregnancy.

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• Diagnosis:-

Detected through blood test that identify antibodies against *Treponema pallidum*. Diagnosis can also include microscopic examination of sores.

• Treatment:-

Effectively treated with antibiotics, typically penicillin. Early treatment is crucial to prevent progression to later stages.

• Prevention:-

Use of condoms, regular STI testing and sexual health education.

★ Gonorrhea:-

A sexually transmitted disease caused by *Neisseria gonorrhoea* (a gram-negative diplococcus bacterium) and most commonly affecting the genitourinary tract is termed gonorrhea.

• Cause: A sexually transmitted infection (STI) caused by the bacterium *Neisseria gonorrhoea*.

• Symptoms:

• In men: Typically causes painful urination, discharge from the penis and swollen testicles. Some may be asymptomatic.

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- In Women: often mild or asymptomatic. Can cause painful urination, abnormal vaginal discharge, and pelvic pain. Can lead to more serious complications if untreated.
- In both: Can cause sore throat (pharyngeal gonorrhea) or rectal infections with symptoms like discharge, itching, or pain.
- Transmission:
Spread through ~~urin~~ sexual contact with an infected person's genital fluids. It can also be transmitted from mother to baby during child birth, potentially causing eye infections in newborns.
- Diagnosis:
Identified through urine test, swabs from the affected area (urethra, cervix, throat, or rectum) or culture tests that grow the bacteria.
- Treatment:
Typically treated with antibiotic, often a combination of ceftriaxone and azithromycin or doxycycline. Resistance to antibiotics is a growing concern.
- Prevention:
Use of condoms, regular STI screening and sexual health education are key measures to prevent infections.