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# Diploma in Pharmacy 2nd Year
# Pharmacotherapeutics
# Important Questions
# Chapter 2 (g) : Infectious Diseases


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# Chapter 2 (g)
# Infectious Diseases
# IMPORTANT Questions

**Q1. What is Tuberculosis ? Give etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# Tuberculosis

→ Tuberculosis is a chronic and progressive infectious disease and affect the lungs usually and its causative agent is mycobacterium tuberculosis or mycobacterium bovis.

→ It is an airborne disease.

## Types of TB

- **Pulmonary TB (Primary) :** Tuberculosis in Lungs.
- **Extra Pulmonary TB :** Tuberculosis in other organs.

## Etiology

- Droplet Infection
- Intake of Unpasteurised Cow Milk
- Re-infection
- Diseased Condition

## Pathogenesis →

| |
|---|
| Entry of Mycobacterium tuberculosis |
| In body (and attack on Immune System |
| Weal Immune System |
| Bacilli increases their number |
| Formation of Granuloma |
| Formation of Cavity in lungs tissues |
| Symptoms |

## Clinical manifestations

- Long term cough
- Blood in Cough
- Shortness of breath
- Fever
- Chest pain
- Weight loss

## Non-Pharmacological Management

- TB patient should be Kept in separate room.
- He should wear mask
- He should keep towel / Handkerchief during coughing , Sneezing.
- He should take healthy nutrition .
- He should follow the directions of healthcare professionals

## Pharmacological managements

- **First line of treatment :** Isoniazid, rifampin, ethambutol, pyrazinamide, streptomycin.
- **Second line of treatment :** Ofloxacin, amikacin, moxifloxacin, ethionamide.
- **Third line of treatment :** Linezolid, amoxicillin, azithromycin etc.

**Q2. What is Pneumonia ? Give etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# Pneumonia

→ Pneumonia is an infection caused by Microorganisms ( Bacteria , viruses , fungus ) in one or both the lungs and can inflammation of the airways and accumulation of mucus ( sputum ) and fluids enter in the alveoli.

## Etiology

- **Bacteria :** Streptococcus Pneumoniae . or Mycoplasma Pneumonia or Chlamydia Pneumonia.
- **Viruses :** Pneumonia can be caused by any virus which causes respiratory infection.
- **Fungi :** Pneumonia rarely occurs due fungi.

## Pathogenesis → Clinical Manifestations

| |
|---|
| Entry of Causative agent ( bacteria ,viruses ) |
| Inflammation |
| alveolar edema or exudate Formation |
| alveoli and bronchioles fill with exudate ( fluid ) |
| Pneumonia |

- Shortness of breath.
- Chill and sweating
- Fever.
- Productive cough.
- Pleuritic chest pain.
- Hypoxemia.
- Fatigue.
- Tachypnoea.

## Non Pharmacological Managements

- Oxygen therapy
- Ventilation
- He should keep towel / Handkerchief during coughing , Sneezing.
- He should take healthy nutrition.
- He should follow the directions of healthcare professionals.
- Oxygen Oximetry Test should be used to measure oxygen level . wh ich 95 % or high is good.
- Bed rest is required.

## Pharmacological Management

- **Antibiotics :** Macrolides should be used in case of Streptococcus P. e.g. Erythromycin , Ezithromycin etc.
- **Antipyretics :** according to need to treat fever and headache e.g. Paracetamol , aspirin etc.
- Antitussive and expectorant.

**Q3. Define Urinary Tract Infection ? Write etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# Urinary Tract Infection ( UTI)

- → UTI is a Bacterial infection of the urinary Tract.
- → It includes
  - Cystitis ( infection of Bladder )
  - Urethritis ( Infection of Urethra )
  - Prostatitis ( Infection of Prostate gland ) and
  - Pyelonephritis ( infection of Kidney )
- → Females are more prone to infection because of short size of Urethra , and closeness to anus.

## Etiology

- **Bacteria :** Commonly UTI is occurs due to E. coli ( Escherichia Coli )

## Pathogenesis

| |
|---|
| Entry of Bacteria in preurethral area ,and Colonization ( staying and increasing their number there ) |
| after Colonization go upwards to Urinary bladder |
| Fimbria ( hair like structure upon bacteria ) help the bacteria in attachment with bladder , and bacterial toxin inhibits the bladder peristalsis and reduces the urine flow |
| Bacteria penetrate the epithelial cells and go upwards to ureters and Kidney and infect them |

## Clinical Manifestations

- Pain in the side back , abdomen or in pelvic area .
- Frequency of urination
- Blood in urine
- Pain during urination
- Urination need at night
- Cloudy colour urine , strong bad smell.

## Non Pharmacological Management

- ❖ Regular hygiene and cleaning are the most important measure to prevent the UTIs.
- ❖ Do the sexual activity by using of the proper protections.
- ❖ During the menstruation use the sanitizing sanitary pad.

## Pharmacological Management

- ◈ Antibiotics are used to treat UTI Like amoxicillin , Ciprofloxacin ofloxacin, ciprofloxacin, norfloxacin, amoxycillin etc.

**Q4. Define Hepatitis ? Write etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# Hepatitis

- → The inflammation of liver is called hepatitis , this inflammation may be due to injury or infection
- → The most common cause of hepatitis is hepatitis viruses different type of viruses caused hepatitis like hepatitis A ,B,C,D,E,F
- → Hepatitis occurs due to other reasons also like alcohol, drugs , and disturbance in metabolism.

## Types

- **Hepatitis A :** It is typically transmitted through contaminated food or water, and symptoms include fatigue, nausea, vomiting, and jaundice. Most people recover within a few weeks without specific treatment.
- **Hepatitis B and C :** These transmitted through blood and bodily fluids, and can lead to chronic infection, cirrhosis, and liver cancer. These types of hepatitis can be asymptomatic for years, and people may not realize they have the infection until liver damage has already occurred.
- **Hepatitis D :** It is a rare form of hepatitis that only occurs in people who are already infected with hepatitis B. It can lead to severe liver damage and cirrhosis.

## Etiology

- Hepatitis A Virus
- Hepatitis B virus
- Hepatitis C Virus
- Hepatitis D Virus etc.

## Pathogenesis →

| |
|---|
| Entry of HAV into body orally |
| Absorption into blood via intestine |
| reach to target hepatocytes |
| Multiplication ( increase in number ) |
| Inflammation of liver |

## Clinical Manifestations

- Fatigue
- Nausea and vomiting, Pain in upper side of abdomen, Clay color stool
- Appetite loss, Fever, Dark color urine, Jaundice, Itching in intestine, Pain in joints

## Non Pharmacological Management

- ❖ Prevention of hepatitis involves good hygiene practices, such as handwashing and safe food preparation, vaccination (for hepatitis A and B), and avoiding high-risk behaviours such as unprotected sex and sharing needles.
- ❖ Early diagnosis and treatment of hepatitis is important to prevent longterm liver damage and complications.

## Pharmacological managements.

- ◈ No treatment is available for Hepatitis A . If infection is detected in early stage the infection can be stopped by hepatitis A Vaccine or Hepatitis A Immunoglobulin.
- ◈ For hepatitis B- Interferon alpha, lamivudine, telbivudine, adenofovir, tenofovir, emtricitabine.
- ◈ For hepatitis C- Ribavirin, boceprevir, imeprevir, sofosbuvir

**Q5. What is Gonorrhoea ? Give etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# Gonorrhoea

→ Gonorrhoea is a sexually transmitted disease , caused by Neisseria Gonorrhoea ( a bacteria ) and most commonly affects the Genitourinary Tract .( all organs involved in formation and excretion of urine , and all the organs involved in reproduction ).

→ It can penetrates mucosal Surface easily.

## Etiology

- Neisseria Gonorrhoea bacteria

## Mode of transmission

- Sexual contact with penis , vagina , mouth or anus of an infected partner.
- Mother to child

## Pathogenesis

| |
|---|
| Entry through Sexual contact |
| Penetrate mucosal surface |
| Inflammation of epithelial tissues |
| ( especially urinary anus and reproductive system ) |
| Gonorrhoea |

## Clinical manifestation

- In females
  - Increased vaginal Discharge
  - Pain during Urination
  - Disturb MC
  - Vaginal Bleeding after sexual intercourse
  - Purulent ( pus) discharge
- In Males
  - Pain during urination ( Dysuria )
  - Pus discharge from penis
  - Itching of penis
  - Pain during sexual activity

## Non-pharmacological managements

- Prevention of gonorrhoea involves practicing safe sex, including using condoms correctly and consistently, limiting the number of sexual partners, and getting regular STI testing.
- Early diagnosis and treatment of gonorrhoea are important for preventing complications and reducing the risk of transmission

## Pharmacological management

- Antibiotics are used to treat gonorrhoea C
- Eftriaxone + azithromycin or Cefixime + azithromycin
- And drugs can be used according to needs like pain killers

**Q6. What is Syphilis ? Give etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# Syphilis

→ Syphilis is a sexually transmitted infection caused by the bacterium Treponema pallidum. It can affect both men and women and is spread through vaginal, anal, or oral sex with an infected person.

→ On the appearance of symptoms, it is categorized as

1. **Primary syphilis** : Appearance of a painless sore, known as a chancre, at the site of infection. The sore may be on the genitals, anus, or mouth and typically lasts 3-6 weeks before disappearing
2. **Secondary syphilis :** This characterized by a widespread rash that can appear all over the body, including the palms of the hands and soles of the feet. Other symptoms may include fever, swollen lymph nodes, sore throat, and fatigue.
3. **Latent syphilis :** This stage has no visible symptoms, but the infection persists and can be detected through blood tests.
4. **Tertiary syphilis :** This stage can occur years after the initial infection and can cause serious complications such as damage to the brain, nerves, eyes, heart, blood vessels, liver, and bones.

## Etiology

- It is caused by Trepnuma Pallidum.

## Pathogenesis

| |
|---|
| Entry of pathogen ( T. Pallidum ) |
| Primary stage ( if it is not treated ) |
| latent Phage ( no symptoms for weeks no lesions ( ulcer ) ) |
| secondary stage |
| latent Phage ( no patches , rashes for weeks ) |
| Tertiary Phase |

## Clinical manifestations

- **Primary stage :** First stage involves a painless ulcer on the sex organs , rectum or mouth
- **Second stage :** Patches and rashes on skin
- **Final stage :** It damage brain , heart , eyes, blood vessels , liver , bones and joints.

## Non Pharmacological management

- Prevention of syphilis involves practicing safe sex, including using condoms correctly and consistently, limiting the number of sexual partners, and getting regular STI testing.
- Early diagnosis and treatment of syphilis are important for preventing complications and reducing the risk of transmission

## Pharmacological managements

- Antibiotics are used to treat Syphilis , specially penicillin . Benzathine Benzylpenicillin , Procaine Benzylpenicillin , Doxycycline , teracycline and erythromycin can be used as alternative drugs.

**Q7. Define Malaria ? Write etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# Malaria

- → Plasmodium, a tiny protozoan is responsible for this disease. Different species of Plasmodium (P. vivax, P. malaria and P. falciparum) are responsible for different types of malaria. Of these, malignant malaria caused by Plasmodium falciparum is the most serious one and can even be fatal.
- → It is transmitted in humans through the bites of infected female Anopheles mosquitoes (vector/transmitting agent). It is interesting to note that the malarial parasite requires two hosts – human and mosquitoes.

## Etiology

- The species of plasmodium responsible for malaria in human , but mainly caused by P. Falciparum and P.vivax . ( 80%) of recognised cases , an d 90% of deaths due to malaria are caused by them two.
- Other causative agents are : P.Ovale , P.malariae , P. semiovale . and female Anopheles mosquito is vector for malaria of human beings.

## Pathogenesis

| |
|---|
| Infected Anopheles Bites ( it has pathogen in saliva ) |
| Sporozoites in bloodstream |
| they migrates to liver |
| (asexual) multiplication in hepatocytes ( Schizont) |
| Rupture of hepatocytes and thousands of Merozoites escape into bloodstream ( merozoites) . ( this cycle places once ) |
| Infection of RBCs |
| Erythrocyte schizont ( multiplication ) |
| Rupture of erythrocytes |
| released a large number of Gametocytes and infect other RBCs |
| This cycle occurs multiple times |
| malaria |

## Clinical Manifestations.

- Fever and headache.
- Fatigue and pain.
- Chill and sweating.
- Nausea and vomiting.
- Spleen enlargement.
- Kidney disfunction

## Non Pharmacological Managements

- ❖ Anopheles vectors are grown on the dirty place so, cleaning is very important.
- ❖ Follow the guidelines, release by the government.
- ❖ Take the balance diet and regular practice of yoga and exercise is very important.
- ❖ Use the mosquito net and mosquito repellent.

## Pharmacological Management

- ◈ Anti malarial drugs are used to treat Malaria which are following
  - Chloroquine
  - Primaquine
  - Mefloquine
  - Doxycycline
  - Atovaquone

**Q8. Define HIV /AIDS ? Write etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# HIV / AIDS

- → HIV, or human immunodeficiency virus, is a virus that attacks the immune system and can lead to acquired immunodeficiency syndrome (AIDS). A widely used diagnostic test for AIDS is enzyme linked immuno-sorbent assay (ELISA).
- → AIDS was first reported in 1981 and in the last twenty-five years or so, it has spread all over the world killing more than 25 million persons.
- → AIDS is caused by the Human Immune deficiency Virus (HIV), a member of a group of viruses called retrovirus, which have an envelope enclosing the RNA genome.
- → Transmission of HIV-infection generally occurs by
    - Sexual contact with infected person.
    - By transfusion of contaminated blood and blood products.
    - By sharing infected needles as in the case of intravenous drug abusers.
    - From infected mother to her child through placenta.

## Etiology

- Its causative agent is HIV ( Human Immunodeficiency virus ).
- HIV belongs to Retroviridae family so it is also called Retrovirus is causative agent of AIDs

## Pathogenesis

| Entry of HIV |
|---|
| Distribution to different cells of the body |
| Bind to receptor ( T cells $CD_4$ ) |
| the virus releases its RNA into the Host cell |
| RNA converted into DNA by reverse Transcription |
| suppress the function of host cell for years |
| AIDs |

## Clinical Manifestations

- Fever and headache.
- Chills.
- Muscles aches and pains.
- Joint pain and fatigue.
- Swollen, lymph nodes mainly on the neck.
- Mouth ulcers and sore throat, Night sweat.
- Others infection also appears like skin disease etc

## Non Pharmacological Managements

- ❖ AIDS has no cure; prevention is the best option.
- ❖ Follow the all precaution (wearing the mask, sterilize the hand etc.) prior to any activities.
- ❖ Take the nutritious diet and make diet chart as per the instruction by the physician

## Pharmacological Management

- ◈ Treatment of Opportunistic infections according to need.
- ◈ **Prophylaxis against Opportunistic infections :** Cortimoxazole Prophylaxis is used in a dose of 960 mg orally /d. or three times per week. in case of intolerance, 100 mg of Dapsone is used per day.
- ◈ **Prophylaxis against TB :** Isoniazid is used
- ◈ **Anti- Retroviral drugs :** These drugs are used for prophylaxis of viral infections and to suppress HIV. these are used in combination : like Zidovudine + Lamivudine + Nevirapine.

**Q9. What is Viral Infection SARS COV-2 ? Give etiopathogenesis, clinical manifestations, pharmacological management, and non-pharmacological management.**

**Ans.**

# Viral infection SARS-CoV-2

→ Coronavirus Disease is a Highly Contagious disease , which is caused by a novel Corona virus ( a new strain that has not been identified previously).

→ This virus affects the respiratory tract badly and stops air flow , now COVID 19 is called SARS-CoV-2 ( Severe Acute Respiratory Syndrome )

## Etiology

- The causative agent of COVID 19 is SARS-COV-2

## Mode of Transmission

- Droplets
- Physical Contact
- Contaminated things,

## Pathogenesis

| |
|---|
| Entry of Coronavirus |
| Macrophage Activation |
| Failure of Immunity |
| Multiplication of Virus In epithelial cells |
| Inflammation |
| acute lungs injury |
| Respiratory failure |
| multiple organ failure |
| death |

## Clinical Manifestation

- Fever
- Dry cough
- Weakness
- Sore throat
- Conjuctivitis
- Difficulty in breathing
- Chest pain

## Non Pharmacological Managements

❖ Public health measures such as vaccination, social distancing, and wearing masks, which remain the most effective means of preventing the spread of viral disease.

❖ Take the balance diet and regular practice of yoga and exercise is very important.

## Pharmacological Management

◈ **Antiviral drugs :** Remdesivir , Ritronavir , Nirmatrelvir etc.

◈ **Monoclonal antibodies :** Bebtelovimab it is a monoclonal antibody , monoclonal is protein made in laboratory that can restore , increase , modify , or mimic the immune system.