



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore - 35
Affiliated to Dr MGR Medical University, Chennai



DEPARTMENT OF PHYSICIAN ASSISTANT

COURSE NAME: PULMONOLOGY

TOPIC :- PULMONARY TUBERCULOSIS

B.SHANMUGAPRIYA

Lecturer

OTAT

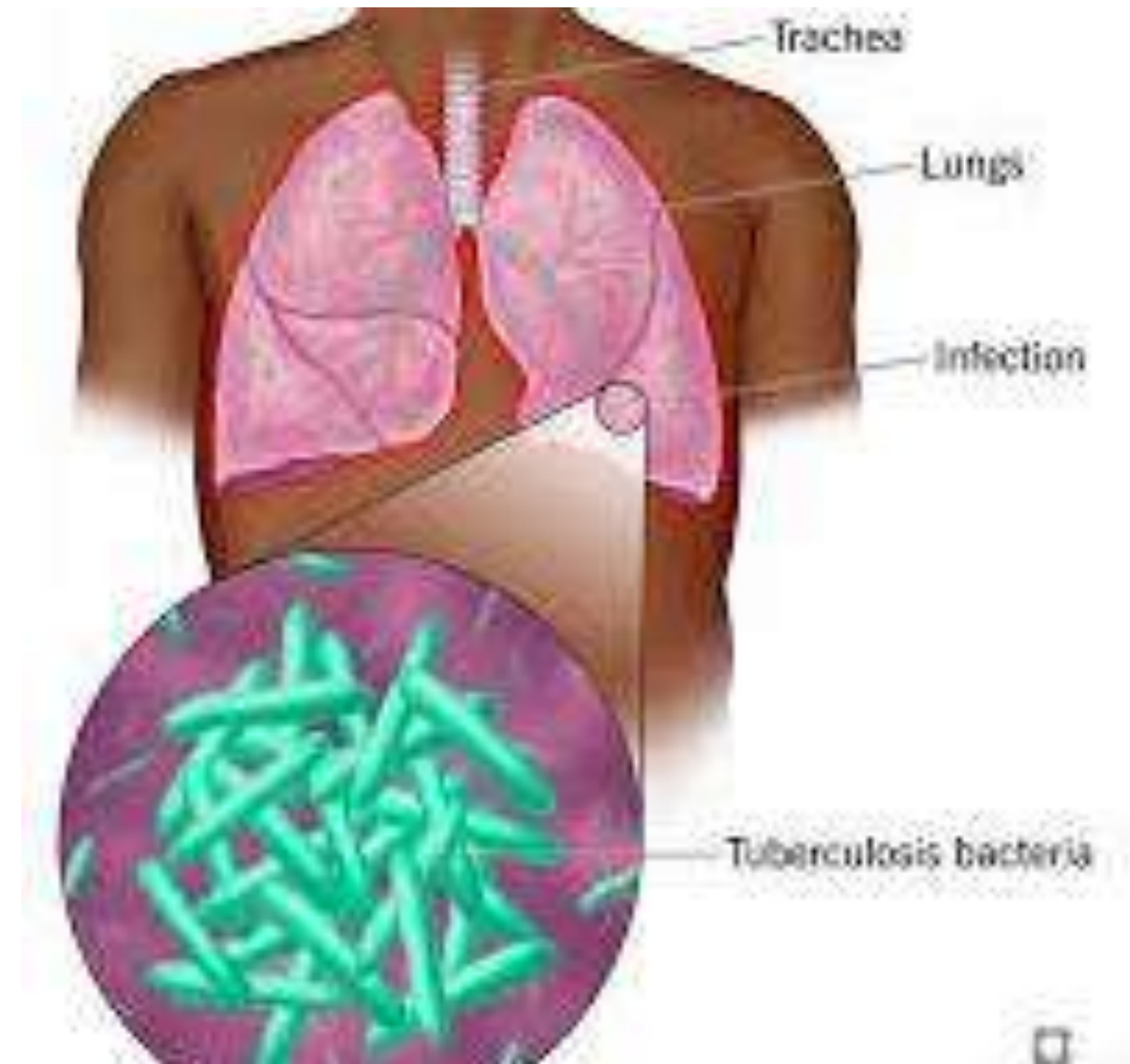
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INTRODUCTION



- Tuberculosis (TB) is a bacterial infection caused by the *Mycobacterium tuberculosis* bacteria.
- It primarily affects the lungs but can also spread to other parts of the body, such as the lymph nodes, brain, or kidneys.
- TB is spread through the air when an infected person coughs, sneezes, or talks, and can be prevented through vaccination, good hygiene practices, and early diagnosis and treatment.
- If left untreated, TB can be fatal, making it a major global health concern.





HISTORY



- In ancient times, TB was known as "consumption" or "phthisis" due to the slow and progressive nature of the disease. It was believed to be a result of poor living conditions, weakened immune systems, and a lack of fresh air and sunlight.
- During the Middle Ages, TB became more prevalent due to overcrowded living conditions and poor sanitation. It was also associated with poverty and malnutrition.
- In the 19th century, the discovery of the bacterium that causes TB by Robert Koch led to a better understanding of the disease and its transmission. This led to improved diagnostic tools and treatments, such as antituberculous drugs.



HISTORY



- The 20th century saw significant progress in TB control, with the development of vaccines and public health campaigns aimed at preventing the spread of the disease. However, TB remains a major global health problem, with an estimated 10 million new cases and 1.5 million deaths in 2019 alone.
- Today, TB is a major challenge for global health due to its high mortality rate, drug resistance, and transmission in crowded settings such as prisons, hospitals, and refugee camps. It is also a significant burden on healthcare systems and economies in low- and middle-income countries.



CAUSES OF PULMONARY TB



1. Exposure to TB bacteria: Pulmonary TB is caused by the bacterium *Mycobacterium tuberculosis*. The bacteria are spread through the air when an infected person coughs, talks, sneezes, or laughs. If you inhale these bacteria, they can settle in your lungs and begin to multiply.





CAUSES OF PULMONARY TB



2. Weakened immune system: People with weakened immune systems, such as those living with HIV/AIDS or undergoing chemotherapy, are at a higher risk of developing active TB because their immune systems are not strong enough to fight off the bacteria.

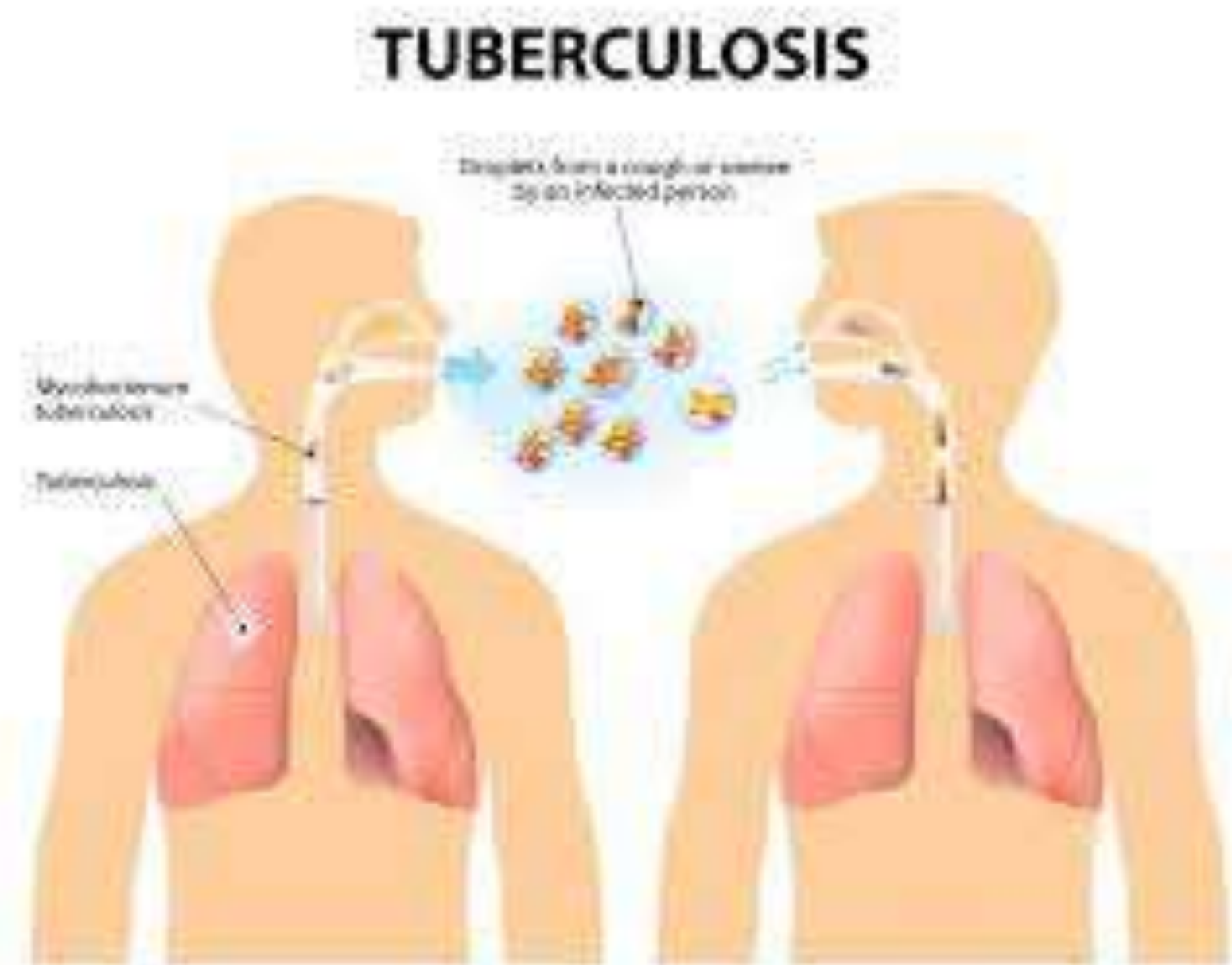




CAUSES OF PULMONARY TB



3. Prolonged exposure to infected individuals: Spending a lot of time in close contact with someone who has active TB increases your risk of getting infected with the bacteria. This is especially true if the infected person is coughing a lot or if the environment is poorly ventilated.





SYMPTOMS



- Cough (persistent for more than 3 weeks) -May produce mucus or blood tinged sputum
- Chest pain or discomfort -May worsen with deep breathing or coughing
- Shortness of breath or difficulty breathing
- Fever or night sweats
- Fatigue or weakness
- Weight loss or loss of appetite
- May be significant, leading to malnutrition and further weakening of the immune system



DIAGNOSIS



1. Physical examination and medical history review: A healthcare provider will ask about symptoms and perform a physical exam to look for signs of TB, such as coughing, chest pain, or fever. They may also ask about risk factors for TB, such as close contact with infected individuals or a history of living in areas with high TB prevalence.





DIAGNOSIS



2. Chest X-ray or CT scan: These imaging studies can help to visualize any abnormalities in the lungs that may be associated with TB, such as lesions or cavities. A chest X-ray is typically the first imaging test performed, as it is less expensive and more widely available than a CT scan. However, a CT scan may be necessary to provide more detailed images of the lungs in certain cases, such as when the diagnosis is uncertain or when complications are suspected.





DIAGNOSIS



3. Sputum tests:

- Sputum is the mucus that is coughed up from the lungs.
- A healthcare provider may ask the patient to provide sputum samples for testing to look for MTB bacteria.
- There are several types of sputum tests that can be used, including smear microscopy, culture, and nucleic acid amplification (NAA) tests.
- Smear microscopy involves staining the sputum with a special dye to make the bacteria visible under a microscope.
- Culture involves growing the bacteria in a laboratory to confirm the presence of MTB.
- NAA tests involve amplifying small fragments of genetic material from the bacteria using a technique called polymerase chain reaction (PCR).
- NAA tests are often used in conjunction with culture to improve sensitivity and reduce turnaround time for results.

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DIAGNOSIS



4. Blood tests: Blood tests can be used to detect antibodies against MTB bacteria or genetic material from the bacteria in the bloodstream (called antigens). These tests are less commonly used than sputum tests because they are less sensitive and specific for TB diagnosis. However, they may be useful in certain situations, such as when sputum cannot be obtained or when there is suspicion of disseminated (spread throughout the body) or extrapulmonary (outside of the lungs) TB.





TREATMENT

- Treatment for pulmonary TB typically involves a combination of antibiotics taken over the course of several months. The specific medications and duration of treatment will depend on various factors, such as the severity of the infection, the patient's overall health, and whether the TB is drug-susceptible or drug-resistant.

Drug	Duration of treatment (months)	Dosage (mg/kg BW/d)	Minimum/maximum dose (mg) *
Isoniazid (INH)	6	5	200/300
Rifampicin (RMP)	6	10	450/600
Pyrazinamide (PZA)	2	25	1500/2500
Ethambutol (EMB)	2	15	800/1600



TREATMENT



The most commonly used antibiotics for treating pulmonary TB include:

- 1. Isoniazid (INH):** This medication is typically taken once a day for 6-9 months. It is effective against both drug-susceptible and drug-resistant strains of TB bacteria.
- 2. Rifampicin (RIF):** This medication is typically taken once a day for 6-9 months. It is effective against both drug-susceptible and drug-resistant strains of TB bacteria.



TREATMENT



3. Ethambutol (EMB): This medication is typically taken once a day for 6-9 months. It is often used in combination with INH and RIF to treat drug-susceptible TB, particularly in patients with HIV or other immune system disorders.

4. Pyrazinamide (PZA): This medication is typically taken once a day for 2 months (along with INH, RIF, and EMB) as part of an intensive phase of treatment for drug-susceptible TB. It is particularly effective against TB bacteria that are present in acidic environments, such as those found in the lungs.



TREATMENT



In addition to antibiotics, other aspects of treatment may include:

- 1. Nutritional support:** Patients with pulmonary TB may experience weight loss and malnutrition due to the infection, so it's important to ensure they are getting enough calories and nutrients to support their recovery.
- 2. Monitoring for side effects:** Some antibiotics used to treat pulmonary TB can cause side effects such as liver toxicity, so it's important to monitor patients closely and adjust dosages or medications as needed to manage any adverse effects.
- 3. Prevention of transmission:** Patients with pulmonary TB should be isolated in a hospital or at home to prevent spreading the infection to others through coughing or sneezing. They should also wear a mask in public settings and avoid close contact with others who may be at high risk for infection, such as young children, elderly individuals, or immunocompromised individuals.



PREVENTION



Prevention of pulmonary TB involves a combination of strategies to reduce the spread of the disease and prevent new infections from occurring. Here are some key prevention measures:

- 1. Vaccination:** The Bacillus Calmette–Guérin (BCG) vaccine is recommended for children in areas with high prevalence of TB. The vaccine provides some protection against MTB infection and disease, but its effectiveness varies depending on the specific strain of TB and the individual's immune system.
- 2. Early diagnosis and treatment:** Prompt diagnosis and treatment of TB can prevent the spread of the disease to others and reduce the risk of complications. Individuals who are at high risk for TB, such as those with HIV or other immune system disorders, should be screened regularly for latent TB infection (LTBI) and treated with isoniazid to prevent progression to active disease.



PREVENTION



3. Airborne precautions: Patients with pulmonary TB should be isolated in a hospital or at home to prevent spreading the infection to others through coughing or sneezing. They should also wear a mask in public settings and avoid close contact with others who may be at high risk for infection, such as young children, elderly individuals, or immunocompromised individuals.

4. Proper ventilation: Good ventilation in buildings and public spaces can help prevent the spread of airborne diseases like TB by reducing the concentration of infectious particles in the air.

5. Healthy lifestyle habits: Promoting healthy lifestyle habits, such as proper nutrition, regular exercise, and avoidance of tobacco smoke and air pollution, can help strengthen the immune system and reduce susceptibility to infection and disease progression.

6. Education and awareness: Providing education and awareness about TB transmission, symptoms, and prevention measures can help individuals make informed decisions about their health and reduce the spread of the disease in their communities.



THANK YOU