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ACTIVE PULMONARY TUBERCULOSIS, LATENT TUBERCULOSIS INFCTION, PRIMARY TUBERCULOSIS, POST-PRIMARY TUBERCULOSIS, MILIARY TUBERCULOSIS, FIBRO - CAVITY TUBERCULOSIS, CAUSES OF PULMONARY TUBERCULOSIS, SYMPTOMS OF PULMONARY TUBERCULOSIS, DIAGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS.

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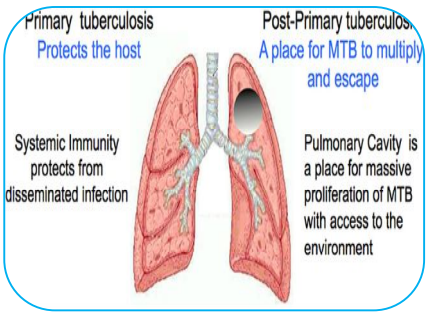
ABSTRACT



Pulmonary tuberculosis is a contagious bacterial disease manifested by mycibacterium tuberculosis. It mainly targests the lungs but can also influences the other parts of the body without treatmewnt. Common types of tuberculosis are active pulmonary tuberculosis, latent tuberculosis infection, primary post primary tuberculosis, miliary tuberculosis and fibro cavity tuberculosis. Pulmonary tuberculosis mainly occurs due to the inhalation of tiny airborne droplets along with bacteria. The release of these droplets takes place , if an infected person coughs. Sneezes, permitting the bacteria to enter the lungs of another individual. A very few conditions namely HIV, AIDS, malnutrition, diabetes, certain cancers and use of immuno suppressive drugs (such as those particularly after organ transplantation) can enhance the risk of individuals in a significant manner rewgarding tuberculosis. Spending a prolonged time in close proximity to an individual with active tuberculosis enhanced the likelihood of transmission. Symptoms of tuberculosis are chills, chest pain, fever, fatigue, loss of appetite, night swears, persistent cough. Diagnosis is based on chest X-ray, sputum analysis, tuberculin skin test (TST), interferon-gamma release assay (IGRA) and molecular tesats namely GeneXpart MTB/RIF. Antibiotics should be administered for a particular period (generally 6-9 months). It is concluded that pulmonary tuberculosis remains a significant global health challenges. It is an essential to enhance awareness particularly about the causes, symptoms and treatment of pulmonary tuberculosis to ensure timely diagnosis and decrease the burdon of this infections disese.

KEY WORDS: *Mycobacterium tuberculosis, active pulmonary tuberculosis, latent tuberculosis infection, primary tuberculosis, post primary tuberculosis. Miliary tuberculosis, fibro cavity tuberculosis, persistant cough, chest pain, fatigue, weight loss, night sweats, sputum with blood, HIV, AIDS, tiny airborne droplets, certain cancers, malnutrition, diabetes, immuno suppressive drugs, improper ventilation, lack of isolation facilities, inadequate use of personal protective equipment, fever, chills, loss of appetite, chest X-ray, sputum analysis, tuberculin skin test (TST), interferon-gamma release assay (IGRA) and molecular tests IGeneXpert MTB/RIF).*

INTRODUCTION:

Pulmonary tuberculosis, often referred to as TB, is a contagious bacterial infection manifested by Mycobacterium tuberculosis. It mainly targets the lungs but can also spread to other parts of the body if left untreated. Although significant progress has been made in the global fight against tuberculosis, it remains a major health concern in particularly in many parts of the world. In this article, we will delve into the causes, symptoms, and treatment of pulmonary tuberculosis, as well as shed light on the importance of early diagnosis and prevention.

Pulmonary tuberculosis is a type of tuberculosis that primarily influences the lungs. There are different types or classifications of pulmonary tuberculosis based on various factors, including the extent and severity of the disease. Here are some common types of pulmonary tuberculosis:

1.Active pulmonary tuberculosis
2.Latent tuberculosis infection
3.Primary tuberculosis
4.Post primary tuberculosis
5.Miliary tuberculosis
6.Fibro cavitary tuberculosis

1.Active Pulmonary Tuberculosis:

This is related to the stage of tuberculosis where the bacteria causing the infection are actively multiplying in the lungs. It is manifested by symptoms namely a persistent cough, chest pain, fatigue, weight loss, night sweats, and sometimes coughing up blood.

2.Latent Tuberculosis Infection (LTBI):

LTBI is a condition in which a person is infected with the tuberculosis bacteria but does not show any symptoms or signs of active disease. The bacteria remain dormant in the body and do not cause illness. However, LTBI can progress to active tuberculosis especially if the immune system becomes weakened.

3.Primary Tuberculosis:

This occurs when a person is initially exposed to the tuberculosis bacteria and gets an infection for the first time. It commonly influences children and individuals with weak immune systems. Primary tuberculosis usually targests the upper part of the lungs and may spread to nearby lymph nodes.

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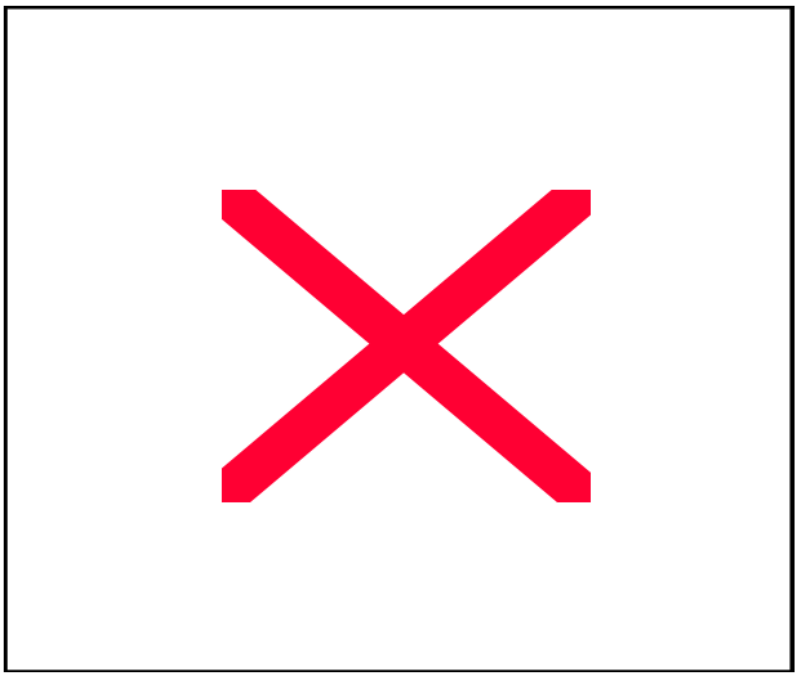
Primary progressive pulmonary



4.Post-primary Tuberculosis:

Also known as reactivation tuberculosis or secondary tuberculosis, this type occurs when the infection reactivates after a period of dormancy. It typically affects individuals with a weakened immune system, such as those with HIV/AIDS or other medical conditions. Post-primary tuberculosis can involve upper or lower lobes of the lungs and may be more extensive compared to primary tuberculosis.

5.Miliary Tuberculosis:

Miliary tuberculosis is a severe form of tuberculosis where the bacteria spread through the bloodstream to various organs in the body, including the lungs. This results in the formation of tiny lesions resembling millet seeds, hence the name “miliary.” It can affect multiple organ systems and is associated with a higher risk of complications.

Miliary tuberculosis

6.Fibro-cavitary Tuberculosis:

Fibro-cavitary tuberculosis occurs when there is extensive lung damage due to tuberculosis infection, leading to the formation of cavities or holes in the lung tissue. It is often observed in advanced stages of the disease and can lead to chronic respiratory symptoms.

Causes of Pulmonary Tuberculosis:

Mycobacterium tuberculosis infection: Pulmonary tuberculosis is primarily manifested by the inhalation of tiny airborne droplets containing the bacteria. These droplets can be released when an infected person coughs, sneezes, or talks, allowing the bacteria to enter the lungs of another individual.

Weakened immune system:

People with weakened immune systems are partucularly more susceptible to developing active tuberculosis. Conditions namely HIV/AIDS, diabetes, malnutrition, certain cancers, and the use of immunosuppressive medications (such as those used after organ transplantation) can significantly enhance the risk.

Close contact with infected individuals:

Spending a prolonged period in close proximity to an individual with active tuberculosis enhances the likelihood of transmission. This is particularly true in crowded environments, such as households, correctional facilities, and homeless shelters.

Lack of access to healthcare:

Limited access to quality healthcare services along with proper diagnosis and treatment of tuberculosis, can contribute to the spread of the disease. This is particularly true in resource-limited areas with insufficient healthcare infrastructure.

Poor infection control measures:

Inadequate infection control measures in healthcare settings, namely hospitals and clinics, can lead to the transmission of tuberculosis. This includes improper ventilation, lack of isolation facilities, and inadequate use of personal protective equipment.

Substance abuse:

Substance abuse, particularly intravenous drug use, can lessen the immune system and enhance the risk of tuberculosis infection.

Poverty and overcrowding:

Living conditions manifested by poverty, overcrowding, and poor ventilation create an environment conducive to the spread of tuberculosis. These factors are often found in marginalized communities and densely populated urban areas.

Symptoms of Pulmonary Tuberculosis:

The symptoms of pulmonary tuberculosis can vary according to the stage of the infection and the overall health of the individual. In the early stages, symptoms may be mild or even nonexistent, making it challenging to diagnose. Whatever it may be, as the infection progresses, the following signs and symptoms may manifest:

Persistent cough:

A cough that lasts for more than two weeks, often accompanied by thick, sometimes bloody sputum.

Fatigue and weakness:

Feeling constantly tired, experiencing a lack of energy, and experiencing unexplained weight loss.

Night sweats:

Heavy sweating, especially during sleep, which may leave the person drenched in perspiration.

Fever and chills:

Low-grade fever, accompanied by occasional chills and a feeling of being cold.

Chest pain:

Pain or discomfort in the chest area, especially while coughing or breathing deeply.

Loss of appetite:

A significant decrease in appetite leading to unintentional weight loss.

Diagnosis and Treatment:

Diagnosing pulmonary tuberculosis involves a combination of various tests. Initially, a healthcare provider will conduct a physical examination, review the patient's medical history, and order specific tests. These tests may include a chest X-ray, sputum analysis, tuberculin skin test (TST), interferon-gamma release assay (IGRA), and molecular tests such as the GeneXpert MTB/RIF.

If pulmonary tuberculosis is finalized, treatment should begin promptly to prevent the spread of the infection and minimize potential complications. Tuberculosis treatment typically involves a combination of antibiotics taken for a specific time (usually six to nine months). It's crucial for patients to complete the full course of medication as prescribed to ensure the complete eradication of the bacteria.

Prevention and Outlook:

Preventing the transmission of pulmonary tuberculosis is important for controlling the disease. Public health measures namely improved ventilation, infection control in healthcare settings, and widespread access to tuberculosis screening and treatment programs are crucial. Additionally, maintaining good personal hygiene, covering the mouth and nose when coughing or sneezing, and avoiding close contact with infected individuals can help decrease the risk of contracting and spreading the infection.

With proper diagnosis, treatment, and adherence to prescribed medication, the prognosis for pulmonary tuberculosis is generally positive. Early detection significantly enhances the chances of successful treatment and reduces the risk of long-term complications or transmission to others.

Conclusion:

Pulmonary tuberculosis remains a significant global health challenge, but with continued efforts in prevention, early detection, and effective treatment, progress is being made. It is crucial to raise awareness about the causes, symptoms, and treatment of pulmonary tuberculosis to ensure timely diagnosis and reduce the burden of this infectious disease. By prioritizing public health measures and individual responsibility, we can work towards a world where pulmonary tuberculosis is no longer a threat to global health.

REFERENCES OR FURTHER READING:-

1. Anderson LF, Tamne S, Brown T, Watson JP, Mullarkey C, Zenner D, Abubakar I. Transmission of multidrug-resistant tuberculosis in the UK: A cross-sectional molecular and epidemiological study of clustering and contact tracing. The Lancet Infectious Diseases. 2014;14(5):406–415.
2. Aranow C. Vitamin D and the immune system. Journal of Investigative Medicine. 2011;59(6):881–886.
3. Bamrah S, Brostrom R, Dorina F, Setik L, Song R, Kawamura LM, et al. Treatment for LTBI in contacts of MDR-TB patients, Federated States of Micronesia, 2009–2012. The International Journal of Tuberculosis and Lung Disease. 2014;18(8):912–918.
4. Barry PM, Gardner TJ, Funk E, Oren E, Field K, Shaw T, Langer AJ. Multistate outbreak of MDR TB identified by genotype cluster investigation. Emerging Infectious Diseases. 2012;18(1):113–116.
5. Benwill JL, Sarria JC. Laryngeal tuberculosis in the United States of America: A forgotten disease. Scandinavian Journal of Infectious Diseases. 2014;46(4):241–249.
6. Blanc FX, Sok T, Laureillard D, Borand L, Rekacewicz C, Nerrienet E, et al. Earlier versus later start of antiretroviral therapy in HIV-infected adults with tuberculosis. New England Journal of Medicine. 2011;365(16):1471–1481.
7. Bonnet M, Bhatt N, Baudin E, Silva C, Michon C, Taburet AM, et al. Nevirapine versus efavirenz for patients co-infected with HIV and tuberculosis: A randomised non-inferiority trial. The Lancet Infectious Diseases. 2013;13(4):303–312.
8. Bonnet M, Ramsay A, Gagnidze L, Githui W, Guerin PJ, Varaine F. Reducing the number of sputum samples examined and thresholds for positivity: An opportunity to optimise smear microscopy. The International Journal of Tuberculosis and Lung Disease. 2007;11(9):953–958.
9. Borrell S, Gagneux S. Infectiousness, reproductive fitness and evolution of drug-resistant *Mycobacterium tuberculosis*. The International Journal of Tuberculosis and Lung Disease. 2009;13(12):1456–1466.
10. Borrell S, Teo Y, Giardina F, Streicher EM, Klopper M, Feldmann J, et al. Epistasis between antibiotic resistance mutations drives the evolution of extensively drug-resistant tuberculosis. Evolution, Medicine, and Public Health. 2013;2013(1):65–74.
11. Bos KI, Harkins KM, Herbig A, Coscolla M, Weber N, Comas I, et al. Pre-Columbian mycobacterial genomes reveal seals as a source of New World human tuberculosis. Nature. 2014
12. Cecchini D, Ambrosioni J, Brezzo C, Corti M, Rybko A, Perez M, et al. Tuberculous meningitis in HIV-infected patients: Drug susceptibility and clinical outcome. AIDS. 2007;21(3):373–374.
13. Cegielski P, Nunn P, Kurbatova EV, Weyer K, Dalton TL, Wares DF, et al. Challenges and controversies in defining totally drug-resistant tuberculosis. Emerging Infectious Diseases. 2012;18(11):e2.
14. Chang KC, Yew WW, Tam CM, Leung CC. WHO group 5 drugs and difficult multidrug-resistant tuberculosis: A systematic review with cohort analysis and meta-analysis. Antimicrobial Agents and Chemotherapy. 2013;57(9):4097–4104.
15. Cheung WY, Luk KD. Clinical and radiological outcomes after conservative treatment of TB spondylitis: iIs the 15 years' follow-up in the MRC study long enough? European Spine Journal. 2013;22 Suppl 4:594–602.

16. Chiang SS, Khan FA, Milstein MB, Tolman AW, Benedetti A, Starke JR, Becerra MC. Treatment outcomes of childhood tuberculous meningitis: A systematic review and meta-analysis. The Lancet Infectious Diseases. 2014;14(10):947–957.
17. Churchyard GJ, Fielding KL, Lewis JJ, Coetzee L, Corbett EL, Godfrey-Faussett P, et al. A trial of mass isoniazid preventive therapy for tuberculosis control. New England Journal of Medicine. 2014;370(4):301–310.
18. Ciardo DE, Burger S, Payer M, Lee C, McCallum N. GeneXpert captures unstable methicillin-resistant *Staphylococcus aureus* prone to rapidly losing the mecA gene. Journal of Clinical Microbiology. 2010;48(8):3030–3032.
19. Cobelens FG, van Deutekom H, Draayer-Jansen IW, Schepp-Beelen AC, van Gerven PJ, van Kessel RP, Mensen ME. Risk of infection with *Mycobacterium tuberculosis* in travellers to areas of high tuberculosis endemicity. The Lancet. 2000;356(9228):461–465.
20. Cohen T, Murray M, Abubakar I, Zhang Z, Sloutsky A, Arteaga F, et al. Multiple introductions of MDR TB into households, Lima, Peru. New England Journal of Medicine. 2011;17(6):969–975.
21. Colditz GA, Brewer TF, Berkey CS, Wilson ME, Burdick E, Fineberg HV, Mosteller F. Efficacy of BCG vaccine in the prevention of tuberculosis. Meta-analysis of the published literature. JAMA. 1994;271(9):698–702.
22. Cole ST, Brosch R, Parkhill J, Garnier T, Churcher C, Harris D, et al. Deciphering the biology of *Mycobacterium tuberculosis* from the complete genome sequence. Nature. 1998;393(6685):537–544.
23. Coll F, Preston M, Guerra-Assuncao JA, Hill-Cawthorn G, Harris D, Perdigao J, et al. PolyTB: A genomic variation map for *Mycobacterium tuberculosis*. Tuberculosis (Edinb). 2013;94(3):346–354.
24. Collins CH, Yates MD, Grange JM. Tuberculosis bacteriology: Organisation and practice. UK: CRC Press; 1997.
25. Comas I, Coscolla M, Luo T, Borrell S, Holt KE, Kato-Maeda M, et al. Out-of-Africa migration and Neolithic coexpansion of *Mycobacterium tuberculosis* with modern humans. Nature Genetics. 2013;45(10):1176–1182.
26. Coussens AK, Martineau AR, Wilkinson RJ. Anti-inflammatory and antimicrobial actions of vitamin D in combating TB/HIV. Scientifica (Cairo). 2014;2014:903680.
27. Coussens AK, Wilkinson RJ, Hanifa Y, Nikolayevskyy V, Elkington PT, Islam K, et al. Vitamin D accelerates resolution of inflammatory responses during tuberculosis treatment. Proceedings of the National Academy of Sciences. 2012;109(38):15449–15454.
28. Cronan MR, Tobin DM. Fit for consumption: Zebrafish as a model for tuberculosis. Disease models & mechanisms. 2014;7(7):777–784.
29. Daley CL, Caminero JA. Management of multidrug resistant tuberculosis. Seminars in Respiratory and Critical Care Medicine. 2013;34(1):44–59.
30. Davies PDO, Gordon SB, Davies GR. Clinical tuberculosis. 5th ed. Boca Raton: CRC Press; 2014.
31. de Jong BC, Antonio M, Gagneux S. *Mycobacterium africanum*-review of an important cause of human tuberculosis in West Africa. PLoS Neglect Tropical Diseases. 2010;4(9):e744.
32. Dharmadhikari AS, Mphahlele M, Venter K, Stoltz A, Mathebula R, Masotla T, et al. Rapid impact of effective treatment on transmission of multidrug-resistant tuberculosis. The International Journal of Tuberculosis and Lung Disease. 2014;18(9):1019–1025.
33. Diacon AH, Donald PR, Pym A, Grobusch M, Patientia RF, Mahanyele R, et al. Randomized pilot trial of eight weeks of bedaquiline (TMC207) treatment for multidrug-resistant tuberculosis: Long-term outcome, tolerability, and effect on emergence of drug resistance. Antimicrobial Agents and Chemotherapy. 2012;56(6):3271–3276.
34. Diacon AH, Pym A, Grobusch MP, de los Rios JM, Gotuzzo E, Vasilyeva I, et al. Multidrug-resistant tuberculosis and culture conversion with bedaquiline. New England Journal of Medicine. 2014;371(8):723–732.
35. Diacon AH, von Groote-Bidlingmaier F, Donald PR. From magic mountain to table mountain. Swiss Medical Weekly. 2012;142:w13665.

36. Donald PR, Schaaf HS, Schoeman JF. Tuberculous meningitis and miliary tuberculosis: The rich focus revisited. Journal of Infection. 2005;50(3):193–195.
37. Dye C, Williams BG. The population dynamics and control of tuberculosis. Science. 2010;328(5980):856–861.
38. Escombe AR, Moore DA, Gilman RH, Pan W, Navincopa M, Ticona E, et al. The infectiousness of tuberculosis patients coinfected with HIV. PLoS Medical. 2008;5(9):e188.
39. Feng Y, Liu S, Wang Q, Wang L, Tang S, Wang J, Lu W. Rapid diagnosis of drug resistance to fluoroquinolones, amikacin, capreomycin, kanamycin and ethambutol using genotype MTBDRsl assay: A meta-analysis. PLoS ONE. 2013;8(2):e55292.