

# Research Paper on Secondary Bacterial Infection in Tuberculosis Patient

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**Abstract – Bacterial infections is one of the most important complications in the patients with pulmonary tuberculosis. We reported the causative microorganisms in these cases with special reference to various clinical features and presented the recommended treatment and prophylaxis against respiratory bacterial infections in the patients with pulmonary tuberculosis sequelae. In 1988 and 1989, 63 patients with tuberculosis sequela were demonstrated to have been infected with respiratory pathogenic bacteria by the quantitative sputum culture method (greater than or equal to 10(7)/ml) in Tokyo National Chest Hospital. The male/female ratio of these patients was 3.5, and their average age was 62.5 years. Causative microorganisms of the secondary infections in the patients with tuberculosis sequela were essentially similar in those with other lower respiratory tract infections, i.e., chronic bronchitis, bronchiectasis, diffuse panbronchiolitis, chronic pulmonary emphysema, etc. *Pseudomonas aeruginosa*, other glucose-nonfermentative Gram-negative bacilli (GNF-GNB), and glucose-fermentative Gram-negative bacilli (GF-GNB) were the major pathogenic bacteria responsible for the chronic respiratory failure and/or fatal outcome in the post-tuberculous patients. Patients with complications, including aspergillosis, atypical mycobacteriosis, bronchial asthma, and so forth, showed no specific causative microorganism for the secondary infections except frequent isolation of *Haemophilus influenzae*. Our clinical observations clearly demonstrated that there were differences between the causative microorganisms in patients hospitalized during 1988 to 1989 and those in patients without admission. Gram-negative bacilli, including *P. aeruginosa*, GNF-GNB and GF-GNB, and *Staphylococcus aureus* were predominant in hospitalized patients. On the contrary, *Streptococcus pneumoniae*, *H. influenzae*, and *Branhamella catarrhalis* were major pathogenic bacteria in patients without hospitalization.**

**Keywords- Secondary Bacterial Infection, Tuberculosis Patient**

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## INTRODUCTION

Tuberculosis is an intense or ceaseless irresistible ailment brought about by a few types of *Mycobacterium*, all in all called as tubercle bacilli. Tuberculosis (truncated TB, which can likewise represent tubercle bacillus) is an incessant granulomatous ailment and a noteworthy medical issue in creating nations. In people, *Mycobacterium tuberculosis* is the essential causative bacterium albeit other *mycobacterium*, for example, *Mycobacterium bovis*, *Mycobacterium africanum*, *Mycobacterium canetti*, and *Mycobacterium microti* are likewise infective. Tuberculosis for the most part assaults the lungs yet can likewise influence the focal sensory system, lymphatic framework, circulatory framework, genitourinary framework, gastrointestinal framework, bones, joints, and even the skin. Tuberculosis is a noteworthy risk murdering around 2 million individuals every year. WHO gauges that 1 billion individuals will be recently contaminated in the period 2000-2020, bringing about 35 million additional passings, almost one billion additional

individuals will be recently tainted, 200 million will become ill and 70 million will bite the dust from TB if control not reinforced and dynamic TB left if untreated. HIV out-breaks; India can additionally affect the expansion of TB in India. TB is currently the world's driving reason for death from a solitary operator. The issue in India is considerably more prominent as it assessed that India represents 1/4th of worldwide TB load. India has an expected 14 million TB cases to which around 2 million are included each year. A larger number of grown-ups in India pass on from TB than from some other irresistible malady, one consistently and in excess of 1,000 consistently and 5 lakh individuals consistently.

## RISK FACTORS FOR CAUSING TUBERCULOSIS:

The accompanying individuals are at higher hazard for dynamic TB:

- Elderly individuals and babies.
- Persons with silicosis have a roughly 30-crease more serious hazard for creating TB.
- Silica particles disturb the respiratory framework, causing immunogenic reactions, for example, phagocytosis which subsequently results in high lymphatic vessel stores.
- It is this obstruction and blockage of macrophage work which builds the danger of tuberculosis.
- Persons with endless renal disappointment who are on hemodialysis additionally have an expanded hazard 10-25 times more noteworthy than the all-inclusive community.
- Persons with diabetes mellitus have a hazard for creating dynamic TB and this hazard is likely more noteworthy in people with insulin-ward or ineffectively controlled diabetes.
- Other clinical conditions that have been related with dynamic TB incorporate gastrectomy with specialist weight reduction and malabsorption, jejunoileal sidestep, renal and heart transplantation, carcinoma of the head or neck and different neoplasms (for example lung malignant growth, lymphoma, and leukemia).
- Low body weight is related with danger of tuberculosis too. A weight file (BMI) beneath 18.5 expands the hazard by 2-3 times and an expansion in body weight brings down the hazard and they have a less fortunate reaction to treatment, perhaps because of less fortunate medication ingestion.
- IV medication misuse; ongoing TB infection or a background marked by insufficiently treated TB; chest X-beam suggestive of past TB, indicating fibrotic sores and knobs.
- Prolonged corticosteroid treatment and other immunosuppressive treatment; Immunocompromised patients (30-40% of AIDS patients on the planet likewise have TB)
- Hematologic and reticuloendothelial ailments, for example, leukemia and Hodgkin's ailment; end-arrange kidney ailment, intestinal detour, unending malabsorption disorders, nutrient D inadequacy.
- Some drugs, including rheumatoid joint pain tranquilizes that work by blocking tumor

putrefaction factor-alpha (an irritation causing cytokine), raise the danger of initiating an inactive infection because of the significance of this cytokine in the invulnerable safeguard against TB.

## REVIEW OF LITERATURE

Tuberculosis and HIV coinfection is perceived as a noteworthy difficulty to both tuberculosis and HIV co-infection control program (Dye C, 2015). HIV is a solid hazard factor for tuberculosis and adds to the improvement of dynamic tuberculosis from inactive and exogenous reinfection. Tuberculosis and HIV coinfection negatively affects TB control program by expanding case load because of overabundance occurrence inferable from HIV infection (Scheele S, 2015). Worldwide rate of TB is assessed at 8 million new cases yearly with 3 million passings (Pathania V). An expansion in TB frequency has been seen in the nations with a high commonness of both tuberculosis and HIV infection (Dolin P.1999). Case definition and finding of TB is changed if there should be an occurrence of TB with HIV coinfection. This can add to underdiagnosis or over finding of smear negative malady. Postponement of conclusion could build the case fatality proportion (CRF) (Rang HP, Dale MM, 2005). Multidrug obstruction and low treatment finish has been seen among TB/HIV coinfecting patients (Ritter JM, Moore PK,2005) bringing about expanded tuberculosis mortality and CFR (R. Ananthanarayan, 2005). Tuberculosis and HIV coinfecting cases have lower treatment consistence, increasingly continuous medication antagonistic responses, and narrow mindedness to sedate ingestion which further debilitates the treatment result (Panikar, CK., 2005). The coinfecting patients could be a hotspot for HIV transmission to TB patients in wellbeing setup through insufficient disinfection of instrument for treatment strategy (Harsh Mohan, 2005).

Notwithstanding the weight HIV and tuberculosis, jungle fever is another major irresistible malady in charge of causing more passing in creating nations (Kumar V, 2007). It is evaluated that over 5.6 million individuals are murdered by HIV/AIDS, tuberculosis, intestinal sickness yearly (T. Mitchell RN2007). Intestinal sickness causes moderately higher mortality in HIV and tuberculosis contaminated patients (Abbaa AK & Collins, 2007). These three sicknesses establish the most genuine wellbeing challenges in Sub-saharan Africa (Fausto & Nelson2007).

In India in general predominance of HIV infection is short of what one percent and henceforth India keeps on being in the classification of low commonness nations. Shockingly, these are the pieces of the existence where TB has been thriving unhindered since ages, shaping a lethal cooperative energy. Comprehensively, 9% of all

new TB cases (31% in Africa) in grown-ups were owing to HIV/AIDS, as were 12 % of the 1.8 million passings from TB, in the year 2000 (SharDipiro TJ, , 2008). As the consequence of HIV/AIDS, rate rates of TB in specific nations have gone up to in excess of 6 percent for every year devastating the as of now overburdened social insurance assets. TB represents around 13 percent of allHIV-related passings around the world (Taibert LR, Yee, 2008). Of the 5.1 million HIV tainted individuals in India, about half them are co-contaminated with M. tuberculosis. Respiratory infections keep on being regular in HIV-1 tainted people, even with the approach of the time of exceptionally dynamic antiretroviral treatment (Matzke RG,2008). The existence time danger of creating TB is 50-70 percent people dually contaminated with HIV and TB, when contrasted with a 10% hazard in HIV pessimistic people (Wells GB, 2008). Consequently, TB is a main source of grimness and mortality in patients with HIV/AIDS (Posey LM., 2008).

HIV and TB are likewise complicatedly connected to unhealthiness, joblessness, liquor abuse, sedate maltreatment, destitution and vagrancy (Sharma et al., 2009). The immediate and aberrant expenses of ailment because of TB and HIV are colossal, evaluated to be in excess of 30 percent of the yearly family pay in creating nations. It catastrophically affects the economy in the creating scene (Havliir and Barnes, 2009). HIV separates the resistant framework and makes patients exceptionally vulnerable to TB. Accordingly, co-infection with HIV and TB (HIV-TB) isn't just a restorative ailment, however a social and a monetary calamity and is apropos portrayed as the "reviled two part harmony".

HIV tainted people who become recently contaminated by M. tuberculosis quickly advancement to dynamic TB. HIV will intensify the TB plague. These patients would then be able to spread TB to other individuals (Vaidyanathanl and Sanjay, 2009). TB is the most widely recognized genuine astute infection happening among HIV-constructive people and is the principal indication of AIDS in over half of cases in creating nations. Perneger et al., (2010) revealed that, around 50-60% of HIVpositive patients in India will create TB in their lifetime. The HIV pestilence has significantly increased TB cases in certain nations (Kenneth, 2010). In a creating nation likeIndia, the potential additional weight of new TB cases inferable from HIV could overpower spending plans and bolster administrations, as has just occurred in nations most vigorously influenced by the HIV plague. TB abbreviates the survival of patients with HIV infection. It is the reason for death for one out of each three individuals with AIDS around the world. It might quicken the movement of HIV to six-seven crease increment in HIV viral burden (VL) in TB patients(Horsburgh et al., 2011). The co-scourges of tuberculosis and HIV require a coordinated exertion to handle. This is of prime significance because of

the unholy nexus between these two infections. The two pestilences need a joint exertion from both TB just as HIV/AIDS control programs.

The methodologies ought to be correlative despite the fact that they might be distinctive in nature. The best way to deal with check the HIV pandemic has so far been founded on preventive mediations since a fix isn't yet accessible. In contrast to HIV, tuberculosis is reparable on the whole, including the HIV contaminated. This idea of joint activity for a synergistic effect has been set up from 2001 onwards in India, and by and by spreads six high HIV predominance states and eight tolerably commonness conditions of India. The key part in the activity plan is the coordination between the Designated Microscopy Center (DMC) of the TB control program and the Voluntary Counseling and Confidential Testing Centers (VCCTCs) of the HIV/AIDS control program. These are available under a similar rooftop in practically all the high HIV predominance areas, to encourage quick cross-referrals of coinfectd patients. To limit the shame related with HIV, secrecy is kept up at the VCCTC level and TB is dealt with independent of HIV status. The HIV status of the patient isn't revealed to the tuberculosis control program while on hostile to TB treatment.

Tuberculosis is a standout amongst the most continuous deft infection in HIV contaminated people. The HIV scourge has been perceived as a central point adding to the expansion of tuberculosis in both the creating and created nations. There are holes in understanding the TB control measures in the time of both tuberculosis and HIV plagues. There are just a couple of concentrates on the circumstance with respect to TB and HIV coinfection in India. Prior information were from all instances of TB under treatment while this examination is the first on recently analyzed cases. There were no previous investigations on the pervasiveness and example of the tuberculosis and HIV. So there is an absence of information on the effect of TB and HIV co-infection on the sputum smear results and wellbeing status.

## OBJECTIVES OF THE STUDY

The particular goals of the proposed research are as per the following:

1. To investigation the predominance of aspiratory tuberculosis in various financial gathering.
2. To evaluate the anthropometric estimation of chose subjects.
3. To assess the supplement admission and nourishment propensities for the



respondents and look at the pre-test and post-test supplement consumption.

4. To discover the nearness of unhealthiness in chose subjects.
5. To propose the dietary rules in pneumonic tuberculosis patients.

## RESEARCH METHODOLOGY

### Example accumulation and transport

The effective separation and recognizable proof of the living being, as in all microbiological strategies relies upon the nature of the example acquired and fitting handling of the examples. Accordingly, endeavors were made to gather 5ml examples in a sterile, airtight, expendable and fittingly named compartments. Patients were approached to hack profoundly and to deliver the purulent sputum from inside lungs. When the sputum was gathered, the top of holder was firmly shut with no spillage. Every one of the examples gathered in the clinic were transported to the research center inside one to two hours of accumulation. The sputum was analyzed for purulence, blood tinged and consistency.

An early morning expectorated sputum in the wake of brushing teeth and warm water washing was gathered independently in a sterile holders from every patient, was incorporated into the investigation. Each patient with 3 sputum tests analyzed for AFB (Acid Fast Bacilli) according to RNTCP rules (Selvakumar et al., 2005). Aspiratory tuberculosis was viewed as dependent on positive microcopy for corrosive quick bacilli (AFB) at any rate on two sputum as well as a development in Lowenstein-Jensen (LJ) medium, (Ramachandran et al., 2003). Additionally patients with Leprosy were viewed as based skin smear positive microcopy by Ziehl-Neelsen (Z.N.) recolor. The examples were transported in transport media (MacConkey, Nutrient and Blood agar).

## ANALYSIS

Among the 143 patient, there were 103 guys and 40 females. Their age ran from 29 to 52, with a middle and mean age of 34 and 36 years separately. HIV was sure in 65 of them. Two sputum were sure for AFB in 43 of the 60 and three in the remainder of the example. Mycobacterium was developed in L.J. medium in 75% of sputum smear (Fig-3), positive cases, X-beam uncovered one or other type of infiltrative sore in each one of those cases positive for AFB, (Fig-4). Pneumonic tuberculosis (PT) was analyzed by sputum examines among 36 (46.1%) of the 78 HIV negative and 16 (24.6%) of the 65 HIV positive, and the thing that matters was critical ( $P < 0.03$ ). The chances proportion and hazard proportion (with certainty interim) for securing PT among HIV positive gathering were 0.38 (0.17 - 0.83)

and 0.53 (0.33 – 0.87) individually (Chi-square  $\chi^2 = 7.11$ ).

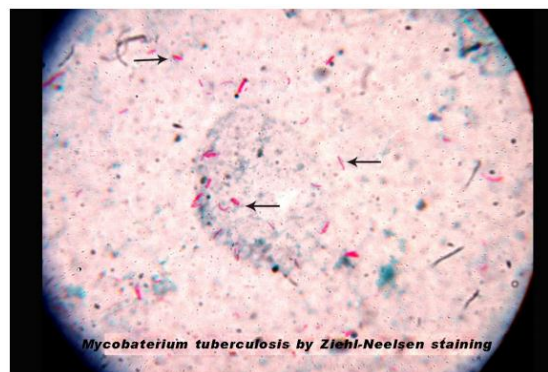


Figure 1. Mycobacterium Tuberculosis by ZiehlNeelsen staining.

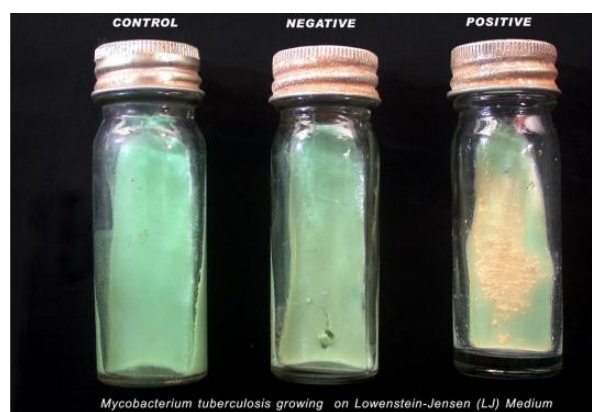


Figure2. Mycobacterium Tuberculosis by Lowenstein –Jensen medium (LJ).

The patients were ordered into four gatherings dependent on nearness or nonappearance of HIV and TB infection viz., Group 1 with HIV infection alone, Group 2 with both HIV and TB positive, Group 3 with TB alone, Group 4 with neither HIV nor TB. The circulation of cases in each gathering was 49, 16, 36 and 42 individually (among 143 cases). The idea of the bacterial secludes in each gathering is appeared in Figure 3.

The living beings indicating irridiscent provinces with garish scent on supplement agar, beta hemolysis with serrated edges on Blood agar were oppressed as Pseudomonas species. They were additionally affirmed by biochemical tests like oxidase, indole, triple sugar iron agar, citrate, urease, catalase, oxidation aging test. The gram negative organism's which were appearing negative, non-maturing with glucose, lactose and sucrose, positive response for citrate, oxidase, urease and catalase by changing the shading (did not age starches). The predominance of confinement of *S. aureus* and *S. pyogenes* was noteworthy ( $P < 0.05$ ) in HIV contaminated than HIV negative gathering appeared in Figure 3.

Anyway intergroup criticalness couldn't be evaluated with reference to polymicrobial infection, as separates were little in number. Amid the examination time frame *S. pneumoniae* and *H. influenzae* were not confined in any of the gathering.

## CONCLUSION

Undernourished people have frail resistance and accordingly they are very defenseless to aspiratory tuberculosis illness. Amid illness whenever given appropriate dietary advising or any kind of wholesome help then we can lessen seriousness of aspiratory tuberculosis sickness. Different examinations demonstrated healthful insufficiencies were found in pneumonic tuberculosis patients. All supplements assume a significant job amid infection. A few supplements keep up body weight and a few supplements increment invulnerability in aspiratory tuberculosis patients. Nutrient A, E, C and D assume a job in the capacity of macrophages, key factor in host safe in pneumonic tuberculosis. Zinc rich eating regimen helps digestion and assimilation of Vitamin A, which has significant job in tuberculosis illness. Those patients are taking enemy of tuberculin drugs they ought to be given satisfactory measure of sustenance. This occasions great sustenance is a significant part of Pulmonary Tuberculosis treatment, great nourishment can help body battle of the microscopic organisms. Being malnourished or underweight can cause progressively helpless to a backslide. Hence amid condition significant for patients to get the correct sustenance. Sufficient measure of Vitamins and minerals and different supplements are important so as to recapture quality and stamina.

## REFERENCES

1. Rao K.N. (1972). History of Tuberculosis. Textbook on Tuberculosis. Bombay, pp. 3-16
2. Chakraborty P, Mycobacterium tuberculosis. A Textbook of Microbiology. New central book agency Pvt. Ltd. 1st ed. 1995; 351-365.
3. World Health Organization, WHO/TB/97. pp. 224.
4. Paramasivan C.N. (1998). An over view of drug resistant tuberculosis in India. Indian J Tuberculosis; 45: pp. 73-81.
5. Dye C., Scheele S., Dolin P., Pathania V. Raviglione, M.C. (1999). Global Burden of Tuberculosis: Estimated incidence prevalence and mortality by country. JAMA.; 282: pp. 677-686.
6. Govt. of India, Ministry of health and family welfare, Times of India. 24th March, 1999.

7. Rang H.P., Dale M.M., Ritter J.M., Moore P.K. (2005). Basic principles of chemotherapy. Pharmacology 5th ed.; pp. 620-653.
8. R. Ananthanarayan, Panikar, C.K. (2005). Mycobacterium-I tuberculosis Textbook of Microbiology Orient Longman Pvt. Ltd. 7th ed.; pp. 351-365.
9. Harsh Mohan (2005). Inflammation and healing. Textbook of Pathology. Jaypee Brothers Medical publishers (P) Ltd. 5th ed: pp. 156-163.
10. Kumar V., Abbaa A.K., Fausto, Nelson, Collins T. Mitchell RN. (2007). Infectious diseases. Robbins – Pathologic Basis of disease W.B. Saunders company Elsevier. 8th ed.; pp. 516-522.
11. Dipro T.J., Taibert L.R., Yee C.G., Matzke R.G., Wells G.B., Posey L.M. (2008). Tuberculosis. Pharmacotherapy a Physiologic approach McGraw Hill 7<sup>th</sup> ed. 2008; pp. 1839-1844.
12. <http://www.who.int/tb/publication/global-report2009/en/index.html> accessed on August 2010.
13. <http://www.en.wikipedia.org/wiki/tuberculosis> accessed on September 2010.
14. <http://www.tuberculosis.htm> accessed on July 2010.
15. <http://www.cdc.gov/nchstp/tb/faqs/qa.htm> accessed on July 2010.

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