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IMPACT OF HIV/AIDS ON TUBERCULOSIS

***DR. SANJAN SANJU**

****M.D (Microbiology)***

INTRODUCTION

Tuberculosis had been one of the most important cause of morbidity and mortality of mankind on earth. The great advances in its diagnosis, treatment, and prophylaxis has brought down the menance considerably. The change in the life style — good sanitary condition, absence of crowding, good nutrition, caused the decline of Tuberculous infection in Europe, much before the discovery of any anti-tuberculous drug/vaccination.

Still, it remains an important infectious disease in the third world countries and among the less privileged population of the Western World, The resurgence of tuberculous infection in the affluent countries has been a new development in the last two decades. This resurgence has occured with H.I.V to prevalence. West has witnessed that H.I.V has the potency to change the epidemiology of tuberculosis considerably.

Tuberculosis is a global menance. It affects all the organs of the body with only a few exceptions. The important organs to be affected are - lung, G.I.T., Lymphnodes, kidney, urogenital, bone, ovary, and endometrium, skin etc. The Gold coin test of diagnosing tuberculosis remains the demonstration of AFB from clinical specimen like sputum or its isolation and identification by culture. The demonstration of AFB unfortunately is almost unusual in extra pulmonary tuberculosis. Even in pulmonary tuberculosis, non Open cases (the patients which does not produce expectoration, or the expectoration does not have the mycobacterium or very low amount of bacterium <5,000/ml.), and the cases in the extreme of ages who fail to expectorate; constitute i. group of cases among whom AFB demonstration is not possible. Haematologic profile of the patients of tuberculosis is non-specific and the patients may show normal total leucocyte count and differential leucocyte count, neutrophilia, neutropenia, lymphocytosis, eosinophilia and even monocytosis. E.S.R, raising is again neither specific nor sensitive. Radiological investigation may provide evidences of Tuberculous infections, 1ut they are never confirmatory. The cavitation and consolidation in skiagram can be out of other microbial infections, meligancies, or biochemical injuries.

The patients who are immuno compromised due to HIV take a different course, if he happens to contract the tuberculous infection, In the patients of atypical mycobacterium, which ordinarily is non- pathogenic can cause the clinical disease. The patients fail to convert macrophage into epitheloid cell, there can be non-specific cellular reaction for example, neutrophilic infiltration or no cellular response at all, Instead of caseation necrosis there happens fibrinoid necrosis and there may be complete absence of epitheloid granuloma — the hallmark of histopathological criteria for diagnosing tuberculosis. There is every possibility that such patients show heavy bacillary load on the hosts and multiple organ disease are so often encountered, Such patients may harbour and spread M.D,R. (Multiple drug resistant) organisms. It is estimated that the new cases of HIV infection will come mostly from third world countries among which India also will have the lion-share, The interplay of mycobacterium and HIV is feared to play a more disastrous effect in India and third world countries than in respect to Europe, because in our part of country the reservoir of Tuberculous infection is much larger than that of Europe in pre HIV era.

REVIEW OF LITERATURE

The World Health Organization in April 1993 declared Tuberculosis a global emergency. Tuberculosis is mankind has known a serious health problem in India for ages. The ancient writing of Indian medicine indicates that tuberculosis was exists in India for more than 2000 years ago.

Hippocrates (460) B.C. the father of medicine called it “Pthysis” which means to dry up. The disease was also referred as “CAPTAIN of the man death”,

In 1882 Robert Koch discovered the tubercie bacillus which ranks one of the most important discoveries in bacteriology and in the history of medicine. In 1907 Von Pirquet discovered the tuberculin test. Bacille Calmette Guerin was tested in 1921. In India B.C.G. vaccine was introduced in 1949.

Galen (A.D. 130) knew pthysis by lung ulceration and had declared that exhalation from a pthystal patient was dangerous.

Parecleus (1493-1541) believed that an outside agent was inhaled which interfered with organ metabolism thereby causing acidity and coagulation, waste products being deposited in the lung and bronchi, blocking of which caused consumption.

Villemin (1865) succeeded in passing the disease from a cow to a rabbit.

In the Galaxy of great scientist who contributed to the progress of the knowledge about tuberculosis the top most honours go to ROBERT KOCH who demonstrated the tubercle bacillus in 1882. In honour of Koch, the bacillus is often referred to as Koch bacillus and the disease is caused a "Koch's disease". Robert Koch once for all proved that the germ was truly the cause of disease by what became latter known as famous "Koch's postulate".

In India the first sanatorium was found by Christian Mission arise near Ajmer in 1905. Another notable happening of the period was the discovery of the Bovine tubercie bacillus by Rovenville of France in 1902.

Harries AD and Dye C (2006 Jul-Sept.) stated that tuberculosis (TB) is a disease of antiquity, caused by Mycobacterium tuberculosis, which principally affects the lungs. It is a major public-health problem, with around 9 million new cases and 2 million deaths estimated to occur each year. Patients with pulmonary TB whose sputum is smear-positive for M, tuberculosis form the main source of infection in communities. About 5%-i 0% of infected individuals are likely to develop symptomatic TB during their lives but the risk of developing the clinical manifestations of the disease is greatly increased by HIV co-infection. The strong association between HIV and TB in sub-Saharan Africa is responsible for the massive increase in the incidence of TB observed in that region in the last 20 years. Diagnosis of TB in resource-poor countries is largely based on sputum-smear microscopy and chest radiography, although these methods lack sensitivity or specificity, especially when used on HIV infected patients. Effective treatment has existed for 40 years but TB- attributable mortality remains high among HIV-infected patients in Africa, who are also particularly likely to develop TB again after receiving drug treatment for the disease. In Eastern Europe it is drug resistance in the local M. tuberculosis that makes the treatment of TB relatively ineffective. The approach to TB control that is now internationally recommended is the DOTS ('directly-observed treatment, short-course') strategy, which aims to prevent the transmission of M. tuberculosis, and the related illness and death, by using combinations of anti-TB drugs to treat patients with the active disease, Unfortunately, countries in subSaharan Africa are falling short of the World Health Organization's targets for case detection and treatment. This failure is, in turn, making the achievement of the Millennium Development Goals for TB--to ensure that the incidence of TB is falling by 2015 and to halve the prevalence of TB and the annual number of TB-attributable deaths between 1990 and 201 5—less likely. To improve the performance and impact of TB-control programme's, in the faãe of HIV co-infection and other constraints on DOTS, the World Health Organization has launched the revised 'Stop TB Strategy'. The new strategy, to be implemented via the Global Plan to Stop TB (2006-2015), includes intensified TB-case finding, treatment of latent TB infection with isoniazid, prevention of HIV infection, cotrimoxazole preventive therapy, and antiretroviral therapy.

Kalafati-Tzimaka E. et al (2008 Sept. -Oct.) observed that comparative analysis was made of 3 conventional tests for tuberculosis (TB) versus a DNA probe technique among suspected TB patients at a reference centre in Greece. During 2004, they tested 2961 biological specimens from 2234 patients with the following methods: Ziehi-Neelsen staining, LöwensteinOJensen culture, BACTEC mycobacteria growth indicator tubes (MGIT) and the Gen-Probe AMPLIFIED Mycobacterium tuberculosis direct test (I'4TD). Of a total of 136 TB patients diagnosed and under anti-TB treatment, 133 of them (98%) were positive by amplified MTD. There were 112 TB (82%) detected by the MGIT method, 102 (75%) by Löwenstein-Jensen culture and 75 (55%) by Ziehi-Neelsen staining. Using MTD the positive result is ready within hours compared with days or weeks.

THE IMPACT OF HIV/AIDS ON TUBERCULOSIS

The pandemic of human immune deficiency virus (HIV) infection d acquired immune deficiency syndrome (AIDS) has caused marked creased in tuberculosis notifications in same countries. By virtue of DS ability to destroy the immune system, HIV has emerged as the most important risk factor for progression of dormant tuberculosis infection to clinical disease. The impact of HIV infection on tuberculosis is greatest in copulation in which the prevalence of tuberculosis in young adults who are at greater risk of HIV infection is relatively high. In 1990, 4.2% of all tuberculosis cases were associated with HIV in the year 2000. It has been expected 13.8% of all tuberculosis cases may be associated with HIV.

To make the global situation worse, tuberculosis has formed a lethal partnership with HIV; The HIV virus damage the body's natural defenses the immune system and accelerates the speed at which tuberculosis progresses from a harmless infection to - life threatening condition.

Tuberculosis is already the opportunistic infection that most frequently kills HIV positive people.

Swaminathan S and Nagendran G (2008 Nov.) observed the global impact of the converging dual epidemics of tuberculosis (TB) and human immunodeficiency virus (HIV) is one of the major public health challenges of our time, The World Health Organization (WHO) reports 9.2 million new cases of TB in 2006 of whom 7.7% were HIV-infected, Tuberculosis is the most common opportunistic infection in HIV-infected patients as well as the leading cause of death, Further, there has been an increase in rates of drug resistant tuberculosis, including multi-drug (MDRTB) and extensively drug resistant TB (XDRTB), which are difficult to treat and contribute to increased mortality. The diagnosis of TB is based on sputum smear microscopy, a 100-year old technique and chest radiography. Extra-pulmonary, disseminated and sputuin smear negative manifestations are more common in patients with advanced immunosuppression. Newer agnostic tests are urgently required that are not only sensitive

and specific but easy to use in remote and resource-poor settings. Treatment of HIV-TB co-infection is complex and associated with high pill burden, overlapping drug toxicities, risk of immune reconstitution inflammatory syndrome (IRIS) and challenges related to adherence. From a programmatic point of view, screening of all HIV-infected persons for tuberculosis and vice-versa will help identify co-infected patients who require treatment for both infections. This requires good coordination and communication between the TB and AIDS control programs in India.

HIV AND TUBERCULOSIS INTERACT IN SEVERAL WAYS

Reactivation of latent infection:

People who are infected with both tuberculosis and HIV are 25-30 times more likely to develop tuberculosis disease than people infected only with tuberculosis. This is because HIV stops the immune system working effectively and tuberculosis bacilli are able to multiply rapidly.

Primary Infection:

New tubercular infection in people with HIV can progress to active disease quickly. People with HIV are at risk of being newly infected if they are exposed to tuberculosis because their weakened immune system makes them more vulnerable.

Recurring Infection:

People with HIV who have been cured of tuberculosis infection may be more at risk of developing tuberculosis again. However, it is not clear whether this is because of re-infection or relapses.

In the community:

There are more new cases of active tuberculosis because more people infected with tuberculosis develop active disease, and those newly infected become ill faster. This means that there are more people in the community, who are infectious to others, Community education is needed to increase awareness that tuberculosis is curable and most important that people are no longer infectious after the few weeks of treatment.

DIAGNOSIS OF TUBERCULOSIS

In the recent years a large number of tests have been evolved which are based on study of patients serum and detection of variety of antigen from the mycobacterium or detection of antibodies.

Serological tests used are:

1. Complement Fixation test
2. Haemagglutination test
3. Latex Particle Agglutination test
4. Gel Diffusion test
5. Immunodiffusion test
6. Enzyme linked immuno sorbant assay (ELISA)
7. Reverse passive haemagglutination test (RPHA)Solid phase radio immuno assay (spira)
8. Adenosine deaminase activity
9. Bromide test
10. Use of DNA probe
11. Polymerase chain reaction
12. Ligase chain reaction

REFERENCES:

1. Abou-Zeid, C. Coccio, C. et al...j Inf. Dis. (1985), Pp 170-78
2. Bania, A.B, Algeorge, G. et al...pneumoftiziologia 1994,July-Dec-43(3-4), Pp. 173-77
3. Bardana, E.J.Jr, et al...Clin. Exp. Immunol. 1978, 13, Pp 65-77
4. Gopi A, et al... Diagnosis and treatment of tuberculosis pleural effusion in 2006, Chest. 2007 Mar, 131(3), 880-9
5. Mattar, S. et al...,Rev. Exp. Microbiol. Clin. 1989, 4, Pp 97-102