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Study of Liver Function Test in Tuberculosis Treatment

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ABSTRACT

Tuberculosis is major problem in India. In India about 1.96 millions of the new cases were reported annually. About 3.8 million of the new cases showed prevalence of the tuberculosis. Antituberculosis treatment is the common cause of drug induced liver injuries or hepatotoxicity in the patients. It has been proved in many studies that the effect occure due the elevated level of the liver enzymes like ALT, AST, ALP.

The study was conducted on the patients of DOTs centres in the North India. About 50 patients were selected. The blood samples were collected from the patients and the liver markes were studied before and after drug therapy.

The levels of the Alkaline phosphatase, Aspartame transaminase, Bilirubin & Plasma albumin were increased significantly after the drug administration. The study concludes that side effects in the patients with anti-tuberculosis drugs shall be monitored regularly.

Key-words: liver function test, Antituberculous, TB.

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Introduction:

Mycobacterium tuberculosis is responsible for the infecting 1/3rd of world's population. When we study the Indian scenario about 40-50% adult population is infected. From this infected populations about 5% of the populations only develops the active disease in 1-2 year. Remaining 2-5% populations develops the disease in later years in the life span.

In India about 1.96 millions of the new cases were reported annually. About 3.8 million of the new cases showed prevalence of the tuberculosis.

In few medical conditions the latent TB infection progression may increases to active diseases. These diseases are HIV infection, injection drug use, history of organ transplant, immunosuppressive therapy, diabetes mellitus, and chronic renal failure.

The progression from latent infection to active disease depends on a number of factors, of which the most important is immunodeficient state [1].

Tuberculosis is a disease caused by Mycobacterium tuberculosis mostly in lungs. M. tuberculosis is pathogenic bacteria; it was first isolated by Robert Koch in 1882. The organisms shows mycolic acid on its cell surface, hence does not stain with normal bacteriological stain but is able to stain with acid fast stain and therefore classified as acid fast Gram positive bacteria [2].

Pulmonary Tuberculosis is condition in which the bacteria in lungs it is taken up by Alveolar macrophages. These macrophages fails to digest the bacteria as the cell wall prevents the phagosomes to fuse with lysosomes. [3].

In the extrapulmonary tuberculosis bacteria may go in the blood stream and cause the infection in other organ such as kidney, brain, spine and other vital organ. These types of conditions are called as TB meningitis, TB of bones, TB of lymph glands and TB of abdomen, etc [4].

The infection is spread through air, droplets due to forceful activities like coughing, sneezing, etc. The person at high risk of exposure are HIV infected patients, coworker in industries especially working in mines, construction works, crushing and hospital staffs of DOT centers, etc [2].

U. S. Food and Drug Administration [FDA] approved 10 drugs for treatment of tuberculosis [4]. s

Below are the commonly uses drug are

- Rifampicin
- Isoniazid

- Pyrazinamide
- Ethambutol

The treatment of tuberculosis primarily starts with four drugs. The drugs prescribed are called as the extensive period or initial phase which lasts for two months after the continuation period in which drugs are reduced to two which endures for 4-8 months subjected condition of patients. [5] These antituberculosis treatments though very effective. The drug are having many side effects mainly on the liver of the patient. As compared to another treatments such antimicrobial and anticonvulsants etc antituberculosis treatment is establish to be main source of drug induced hepatitis or hepatotoxicity[6].

Abnormal liver enzyme tests are not uncommon in patients starting anti-TB treatment, they may be caused by a variety of factors such as hepatitis, alcohol and TB itself. Treatment can usually still be given but careful monitoring is required. Some patients may develop abnormal liver or worsening liver enzyme levels whilst Anti-TB treatment this may result in treatment having to be disturbed.

In many studies had notes that elevation of the liver enzymes. The following are the list of Liver enzymes gets elevated from its normal range. This elevation of the enzymes may be responsible for the malfunctioning of the liver or liver toxicity.

- Alkaline phosphatase (ALP),
- AspartateTransaminase (AST)
- Serum Glutamic Pyruvate Transaminase [SGPT]
- Serum Oxaloacetic Transaminase [SGOT]

Methodology[7-9]:

The study was conducted on the patients of DOTs centres in the North India. About 50 patients were selected. All the patients are informed consents.

Following are the inclusion & exclusion criteria of the patients enrolled in to the study.

Inclusion Criteria:

- Patients of above 18 years
- Patients having positive sputum to TB

Exclusion Criteria:

- Patients having negative sputum negative to TB
- Pregnant females
- Patients having other diseases

Required permission were obtained from the concerned authorities for the study. The all the subject were informed about the aim of the study.

The blood samples were obtained from the patients. The samples were then sent to the pathological findings of the liver markers.

Result & Discussion:

The total 50 patients were enrolled in to the studies. Out of the 50 patients 32 were the males & 18 were the females. The age group of the patient are ranging from 18-50 years.

Table 1 : Age group of the patients

Age Group	Number of Subjects
18-30 years	12
31-40 years	25
40-50 years	13

Table 2 : Liver functions test before & after treatment

Liver Enzymes	Before using Drugs	After using drugs
Alkaline phosphatase (ug/l)	21.05 ± 5.8	67.4 ± 9.6
AspartateTransaminase (ug/l)	24.6 ± 6.9	76.30 ± 6.8
Bilirubin (mg/dl)	0.71 ± 0.20	3.6 ±0.90
Albumin (gm/dl)	4.20 ± 0.50	2.9 ± 0.35

The table 2 shows the data of the patients. The liver markers were compiled in the above data before & after start of the anti-tuberculosis drug. The levels of the Alkaline phosphatase, Aspartame transaminase, Bilirubin & Plasma albumin were increased significantly after the drug administration.

The Alkaline phosphatase level before using drug was 21.05 ± 5.8 ug/l and it is increases to 67.4 ± 9.6. Aspartate Transaminase levels were increased after drug administration to 76.30 ± 6.8 ug/l from the level of 24.6 ± 6.9 ug/l. The bilurubine was 0.71 ± 0.20 mg/dl was increased to 3.6 ±0.90 mg/dl. Also

the Albumin levels were decreased after drug administration to 2.9 ± 0.35 mg/dl. Before drug administration the plasma Albumin level was 4.20 ± 0.50 mg/dl.

The liver function tests were not routinely monitored in the tuberculosis therapy. So increase in above enzymes may results in the side effects. These may be minor to life threatening effects. Hence the side effects in the patients with anti-tuberculosis drugs shall be monitored regularly. Different studies concluded that patients hospitalized for pulmonary tuberculosis need closer monitoring for side-effects [10,11]. The hepatic functions alters due to increase in plasma concentration of bilurubine and other liver enzymes. These are aleready reported in previous studies [10-12].

Conclusion:

It can be concluded that the antituberculosis treatment impose hazardous effect on the patients liver leading to hepatotoxicity or drug induced liver injuries, most commonly drug induced hepatitis. Results obtained vary from person to person depending upon the immune response mounted by the individual.

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