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Research and Reviews: Pharmacology and Toxicological Studies

Short Notes on Tuberculosis

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Short Commentary Article

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INTRODUCTION

Tuberculosis is a chronic disease that is effecting most of the individuals all over the world.As long time and multiple therapy medication is taken ,adverse reactions are most common.Discontinous medications either temporarily or permanently shows risks to the individuals and TB resistance become complex and has serious adverse effects. The WHO recommends to create and to develop pharmacovigilance around the world in order to receive the global fund grants to strengthen it.The recommendations include [1-6];

1) Monitoring the weight
2) Patients: genetic predisposition, malnutrition
3) Natriuretic of day
4) Awareness of TB among the people
5) Examine the edemas & achieving the pharmaco-epidemiological studies

It is caused by the mycobacterium tuberculosis in any organ of the body but involvement in the extra pulmonary sites like breast, spleen, skeletal muscles is very rare.

Diagnosis of tuberculosis was made by Fine Needle Aspiration Cytology and Ziehl Neelson Staining of the pus in the breast abscess was confirmed on culture by the ultrasound breast and immediately anti-tubercular therapy medication has to be used by the individuals [7].

It is also called as phthisis pulmonalis.It is a wide spread and fatal infectious disease typically attacks the lungs and also other parts of the body. The contamination of the disease occurs through the sneezing, coughing and through the respiratory fluids through the air.

SYMPTOMS OF THE TB INFECTION INCLUDE:

1) Chronic cough

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2) Fever
3) Night sweats
4) Weight loss
5) Sputum in the blood
6) Fatigue
7) Nail clubbing

TRANSMISSION:

When people with Tuberculosis in the lung cough, sneeze, sing, spit, speak, they expel the infectious droplets of 0.5 to 5.0 μm in diameter. Each one of the droplets may transmit the disease due to the inhalation of fewer than 10 bacteria may cause an infection as the infectious dose of tuberculosis is very small.A person with active but untreated may infect the 10 to 15 other people per year.

PATHOGENESIS:

Most of the individuals who are affected with Mycobacterium tuberculosis have no symptoms ie asymptomatic. The infection begins when the bacteria reach the pulmonary alveoli of the lung which invades and undergoes replication within endosomes of alveolar macrophages. These macrophages identify the bacteria as foreign microorganisms and they invade by the process known as Phagocytosis. During this, the whole bacteria is enveloped by the macrophages and gets stored in temporary bound membrane known as phagosome.This phagosome gets combined with the lysosome and forms phagolysosome.This attempts to utilize the free radical species of reactive oxygen species and acid in order to kill the bacteria. But the M. Tuberculosis has a thick waxy mycolic acid capsule that protects it from toxic substances and it actually reproduces in the macrophages and later kills the immune cell.

The host immune response against the bacteria immediately after phagocytosis by the macrophages cells and the receptor cells. These cells generate innate immune response and lead to the production of pro-inflammatory cytokines which amplifies anti-microbial activity against the pathogen [8].

It leads the cause of death globally 8.6 million new cases and 1.3 million deaths every year. To enhance the DOTS program, by understanding the reasons for unsuccessful outcomes for the improvement of treatment strategy

In this, pulmonary TB is the most commonly seen in the individuals. Diagnosis of TB in children on the grounds of clinical & radiological findings becomes difficult due to the lack of etiology confirmation.

It can be confirmed by the detection of acid fast bacilli in respiratory specimens. More procedures and measures have to be taken for the diagnosis of disease [10].

Recent studies tells that the persons who are consuming 40grams per day leads to cause more prone to TB [11].More attention should be in the prevention and retreatment cases to avoid social and economic burden of TB as the success rate for treatment is reducing and prevalence of TB has been increasing [12].

Various tests have been using for the treatment of TB. Monteux testing confirms the exposure of the patient to tubercle bacilli. ziehl Nielsen staining by culture gives best result for the appearance of pathogen. PCR is highly sensitive for the treatment of TB [13-16].

Prevention and Diagnosis of the disease can be relies on the;
1) Bacillus Calmette-Guérin vaccine
2) Radiology
3) Microbial culture

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4) Tuberculosis skin test
5) Blood test

Major factors that have involved for new TB drugs include [17-19];

1) Total duration of the treatment has to be reduced.
2) Improvement for the treatment of MDRTB
3) Effective treatment should be provided for the infection.

The emergence and continued spread of drug resistant of TB prevails a enormous challenges for control programme of global public health. Conventional multi drug & resistant TB treatment success rates reduced due to the poor patient adherence combination therapy with standard drug regimen helps and promotes the fight against drug resistant for TB [20-22].

Aids people easy prone to the TB. Along with the anti-retroviral drugs, anti-TB therapy is also used in order to understand the pharmacokinetics and pharmacodynamics for the improvement in the treatment [23].A very promising result for the detection of TB can be identified by the advanced nucleic acid amplification system which is by polymerase chain reaction. But the usefulness, priority and scope of various technology used in the treatment of TB depending upon the epidemiological conditions prevailing in individual countries [24].

Research has been done on potential candidates which are currently in phase I and II clinical trials as the BCG vaccine has certain limitations and more research has been carried out to develop new TB vaccines as the bacteria is getting more resistance towards the multi-drug anti-biotic.

Two better main approaches are being used to attempt in order to improve the efficacy of the vaccines. One approach involves adding a subunit vaccine ie MVA85A of BCG had other is to create new live vaccines. These vaccines play a significant role in controlling in both the latent and active diseases.

A large number of medications has been studied for multi-drug resistant TB including edaquiline and delamanid, it got approved in the late 2012 by the USFDA, but still the safety and effectiveness of these agents are uncertain. But the patients who are consuming bedaquilline along with TB therapy are five more times more likely to die than those without the new drug which results in medical journal articles raised health policy questions about why the FDA approved the drug and other consequences make the company to use the drug which is influenced by the physicians support.

The future aspects are to control and organising campaigns for Tuberculosis. A multi-drug therapy of 6-12 month regimen of fluoroquinolone + pyrazinamide or ethambutol + pyrazinamide is recommended by CDC. At different stages of development the use of newer drugs may offer alternatives for Tuberculosis as the effectiveness and optimal duration of thes regimen therapy is unknown as they are poorly tolerated.

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