

Review on Overview and Management of Tuberculosis Disorder

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Abstract: Tuberculosis (TB) is an infection of the lungs and respiratory system, which is the organ system that allows us to breathe. TB is caused by a bacterium called *Mycobacterium tuberculosis*. It spreads from person to person when an infected person coughs, sneezes, laughs, or spits. Tiny droplets of fluid from the lungs are carried in the air and breathed in by someone nearby. Although it can affect many parts of the body, TB usually occurs in the lungs. One third of the world's people are infected with TB, and along with HIV, TB is one of the world's leading causes of death due to disease. The World Health Organization (WHO) estimates that over three million women became sick with TB in 2014. Of the almost ten million new cases of tuberculosis in 2014, over one million occurred in people living with HIV (HIV+). The risk of developing TB is estimated to be 26 to 31 times greater for people living with HIV than for those who are HIV-negative. The largest numbers of TB infection occur in southeast Asia and the Western Pacific (58 percent of global total), while Africa had the most severe TB burden in relation to its population. The good news is that the number of people living with TB across the globe in 2015 was 42 percent lower than in 1990. In the US, the number of new TB cases reported declined each year from 1993 to 2014; there was a slight increase in the number of cases in 2015 (1.6 percent more than in 2014). According to the Centers for Disease Control and Prevention (CDC), the number of TB cases reported in 2014 was the lowest that is has been since reporting began in 1953.

Keywords: Tuberculosis, *Mycobacterium tuberculosis*, Lungs

I. INTRODUCTION

Tuberculosis (TB) is an infection of the lungs and respiratory system, which is the organ system that allows us to breathe. TB is caused by a bacterium called *Mycobacterium tuberculosis*. It spreads from person to person when an infected person coughs, sneezes, laughs, or spits. Tiny droplets of fluid from the lungs are carried in the air and can be breathed in by someone nearby. Although it can affect many parts of the body, TB usually occurs in the lungs. One third of the world's people are infected with TB, and along with HIV, TB is one of the world's leading causes of death due to disease. The World Health Organization (WHO) estimates that over three million women became sick with TB in 2014. Of the almost ten million new cases of tuberculosis in 2014, over one million occurred in people living with HIV (HIV+). The risk of developing TB is estimated to be 26 to 31 times greater for people living with HIV than for those who are HIV-negative. The largest numbers of TB infection occur in southeast Asia and the Western Pacific (58 percent of global total), while Africa had the most severe TB burden in relation to its population. The good news is that the number of people living with TB across the globe in 2015 was 42 percent lower than in 1990. In the US, the number of new TB cases reported declined each year from 1993 to 2014; there was a slight increase in the number of cases in 2015 (1.6 percent more than in 2014). According to the Centers for Disease Control and Prevention (CDC), the number of TB cases reported in 2014 was the lowest that is has been since reporting began in 1953.

Worldwide, TB is the leading cause of death in people living with HIV in Africa, and a leading cause of death elsewhere. The WHO estimates that one third of the 35 million people living with HIV worldwide are infected with TB. The CDC recommends that people living with HIV be screened for TB when they are first diagnosed with HIV; in addition, yearly screening is recommended for people living with HIV who have repeated exposure to others with active TB (see "Diagnosing TB," below).

Management of Tuberculosis

Objective

- 1) Cure the individual patient.
- 2) To minimize risk of death and disability.
- 3) To reduce transmission of M. tuberculosis to other person.
- 4) To improve TB patients health.

TREATMENT OF TUBERCULOSIS

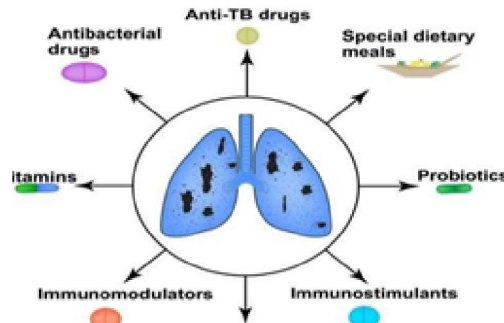


Fig. no. 1 Tuberculosis Treatment

MANAGEMENT OF TUBERCULOSIS [4,8,10,12] :

There are two types of treatment for TB:

Preventive Treatment :

If you have latent or inactive TB (infected but no symptoms), your health care provider will likely suggest that you start treatment to help your body get rid of the TB germ. This treatment is intended to prevent active TB (TB with symptoms) from developing. Treatment typically involves nine months of an antibiotic called isoniazid (INH) plus vitamin B6 supplements. Although it is recommended that all people living with HIV begin taking HIV drugs as soon as possible, there may still be rare instances in which people living with HIV and TB are not yet taking HIV drugs. Those people living with HIV who are not taking HIV drugs may be treated with INH and B6 plus rifapentine or rifampin for only three months. The INH, B6, and rifapentine or rifampin treatment combination is not recommended for people on HIV treatment because rifapentine and rifampin can interact negatively with some HIV drugs. Your health care provider will help you decide which treatment option is best for you.

During INH and B6 treatment, your provider will draw lab tests to check for any side effects from the INH medication, such as liver inflammation. The first set of lab tests will be done after you have taken the medication for one month. Also, your provider will question you regularly about any side effects you may be having from the INH. Possible side effects from INH include:

Loss of appetite.

Nausea and/or abdominal pain.

Jaundice (yellowing of the skin, eyes, and mucous membranes) dark rash.

Numbness and tingling of your hands and/or feet (peripheral neuropathy). Fever and weakness for more than three days muscle soreness.

Long lasting fatigue (extreme tiredness).

Treatment of Active Disease [4,7]

Treatment of active TB requires combination therapy. The usual regimen is: Isoniazid (INH).

Rifampin (also known as rifampicin, Rifadin, or Rimactane) Pyrazinamide. Ethambutol (Myambutol).

These four drugs are taken daily for 6-9 months. Tests can be done to see how well the drugs are fighting the TB. If the drugs are fighting the TB well, then the treatment changes to just two drugs: isoniazid plus rifampin for four more

months. Sometimes the treatment will last longer, depending on whether or not the TB is resistant to these drugs, or if the TB disease has spread through the bloodstream to other parts of the body.

Forms of TB

Being infected with TB does not mean a person is contagious or able to spread TB. This is because not everyone who is infected with TB bacteria shows signs of TB infection or develops "active" disease.

Latent/Inactive TB - Most people with healthy immune systems can fight off TB bacteria, even after they breathe them in and are infected. This is called latent TB, which means it is inactive. People with latent or inactive TB are infected with TB yet have no symptoms. They do not feel sick and cannot spread the disease to other people. In some people, TB stays latent or inactive for their entire lives. But in other people, latent TB turns into active disease if their immune system is damaged or weakened, through things like HIV infection, cancer, or transplant surgery that requires taking drugs to suppress the immune system.

Active TB - Some people infected with TB develop active disease. Active TB usually causes symptoms like coughing and weight loss. People with active TB can spread it to others. Active TB may develop either soon after infection or years later when a person's immune system becomes weaker.

Preventing TB [3]

TB is spread through the air when an infected person coughs, sneezes or spits.

Family members of people with TB, people living in the same house, healthcare workers, and people who live in residential facilities like homeless shelters and prisons are most likely to get TB. People with latent (inactive) TB do not spread the disease. Once a person with active TB starts treatment (see "TB Treatment" below), they usually cannot spread the disease after two to three weeks on treatment. People with active TB should be separated from others until they can no longer spread the disease. If you have TB or spend time around people with TB, it is important to wear a disposable face mask. Certain types of air filters can trap the TB bacteria, and ultraviolet light can kill it.

TB Symptoms

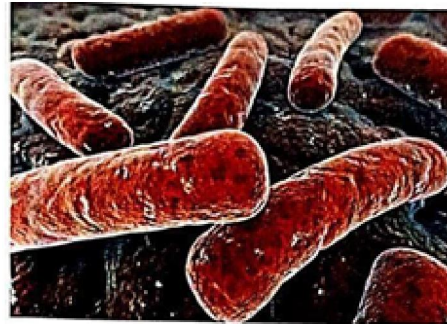


Fig: Mycobacterium tuberculosis

After TB bacteria are inhaled, they settle in the lungs. People with healthy immune systems can usually fight the bacteria and keep it from multiplying. The immune system may build structures that wall off or contain the bacteria. These structures can burst, leaving scars in the lungs. If a person's immune system is too weak and the structures burst, the bacteria can get out and enter the bloodstream. Once in the bloodstream they travel to other parts of the body including the brain, kidneys, bones, and reproductive organs, where they can cause infertility. This is called "extrapulmonary TB" because it has spread outside the lungs. Extrapulmonary TB is more likely in people with advanced HIV disease.

People with active TB disease may develop symptoms including: Cough lasting more than two to three weeks

Coughing up sputum (phlegm) or blood Unexplained weight loss

Fever or

chills

Night sweats

Fatigue (unusual tiredness)
Loss of appetite
Chest pain

Finding and Diagnosing TB [2,4]

It is recommended that people living with HIV get screened for TB using a skin or blood test. The skin test is called a TST (tuberculin skin test) or PPD (purified protein derivative; this is the substance used to do the test). A small amount of "tuberculin" (a TB protein) is injected under the skin of the arm, and the test is checked or "read" two to three days later by a health care worker who looks at the spot on the arm and measures any swelling. The test is positive if the area develops a hard swelling under the skin that is bigger than 5mm (5mm is a little smaller than a standard pencil eraser). There is also a blood test that screens for TB called an interferon- gamma release assay (IGRA) that measures your immune response to TB. With the IGRA test, there is no need to return to a health clinic; results are usually available within 24 hours and can be communicated by phone. Because people living with HIV sometimes do not develop a positive TB skin test reaction even if they are infected, the TB blood or sputum tests are now the preferred tests for those living with HIV. A positive TB skin or blood test shows that you have been exposed to TB, but it does not mean you have active TB disease.

Diagnosis [2,8,9]

For people who are suspected of having active TB because they have symptoms, providers will often suggest a TB test called the Xpert MTB/RIF test. This test uses sputum (mucus or phlegm you cough up from your lungs) and takes less than three hours to give results. It tests for the genetic material of TB (TB's DNA) and for resistance to rifampin (a drug used to treat TB; see more below) at the same time.

DRUGS [3,4,5,6,9,12]:

All first-line anti-tuberculous drug names have a standard three-letter and a single-letter

- Ethambutol is EMB or E,
- Isoniazid is INH or H,
- Pyrazinamide is PZA or Z,
- Rifampicin is RMP or R,
- Streptomycin is SM or S.

First-line anti-tuberculous drug names are often remembered with the mnemonic "RIPE," referring to the use of a rifamycin (like rifampin), isoniazid, pyrazinamide, and ethambutol. The US uses abbreviations and names that are not internationally recognized: rifampicin is called rifampin and abbreviated RIF; streptomycin is abbreviated STM. In the US only, streptomycin is no longer considered a first line drug by ATS/IDSA/CDC because of high rates of resistance. The WHO have made no such recommendation.

Drug regimens are similarly abbreviated in a standardized manner. The drugs are listed using their single letter abbreviations (in the order given above, which is roughly the order of introduction into clinical practice). A prefix denotes the number of months the treatment should be given for; a subscript denotes intermittent dosing (so means three times a week) and no subscript means daily dosing. Most regimens have an initial high-intensity phase, followed by a continuation phase (also called a consolidation phase or eradication phase): the high-intensity phase is given first, then the continuation phase, the two phases divided by a slash. So, 2 HREZ/4HR3 means isoniazid, rifampicin, ethambutol, pyrazinamide daily for two months, followed by four months of isoniazid and rifampicin given three times a week.

DOTS [3,5,6]

Tuberculosis is completely curable through short-course chemotherapy. Treating TB cases who are sputum-smear positive (and who can therefore spread the disease to others) at the source, it is the most effective means of eliminating TB from a population. DOTS or Directly Observed Treatment Short course is the internationally recommended strategy. TB control that has been recognized as a highly efficient and cost-effective strategy.

DOTS comprises five components.

1. Sustained political and financial commitment. TB can be cured and the epidemic reversed if adequate resources and administrative support for TB control are provided
2. Diagnosis by quality ensured sputum-smear microscopy. Chest symptomatic examined this way helps to reliably find infectious patients
3. Standardized short-course anti-TB treatment (SCC) given under direct and supportive observation (DOT). Helps to ensure the right drugs are taken at the right time for the full duration of treatment.
4. A regular, uninterrupted supply of high quality anti-TB drugs.
Ensures that a credible national TB programme does not have to turn anyone away.
5. Recording and reporting. Helps to keep track of each individual patient and to monitor overall programme performance.

II. CONCLUSION

TB is a serious disease that is a leading cause of death in people living with HIV worldwide. Many people can keep TB under control and have latent, or inactive, disease. But people with weakened immune systems, including some people living with HIV, are much more likely to develop active TB disease that needs treatment. In many ways, TB and HIV treatment are similar. Both diseases must be treated with a combination of drugs, since using only one drug can lead to resistance. With both TB and HIV, good adherence is a very important factor in successful treatment. But unlike HIV, TB can usually be completely cured after less than a year of treatment.

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