TUBERCULOSIS

TUBERCULOSIS is an infectious disease caused by strains of bacteria called *Mycobacterium tuberculosis.* There is a social stigma attached to this disease as in earlier times it has been fatal in majority of the cases.

HISTORY

Tuberculosis has been known to mankind since times as old as 17,000 years. There have been evidences that indicate the presence of the bacteria in Egyptian mummies as well.

Earlier tuberculosis was known as pthisis or consumption. It was a disease that affected a major part of the population and was epidemic in certain parts of the world.

Dr. Robert Koch discovered the causative agent *Mycobacterium tuberculosis*.

EPIDIMEOLOGY

Roughly one-third of the world's population has been infected with *M. tuberculosis*, with new infections occurring in about 1% of the population each year. However, most infections with *M. tuberculosis* do not cause TB disease, and 90–95% of infections remain asymptomatic.

Tuberculosis is the second-most common cause of death from infectious disease (after those due to HIV/AIDS).

CAUSATIVE AGENT

The main cause of TB is *Mycobacterium tuberculosis*, a small, aerobic, nonmotile bacillus. The high lipid content of this pathogen accounts for many of its unique clinical characteristics. It divides every 16 to 20 hours, which is an extremely slow rate compared with other bacteria, which usually divide in less than an hour.

TYPES OF TUBERCULOSIS

1. **PULMONARY TUBERCULOSIS**
   When the bacteria infects the lungs, it is known as pulmonary tuberculosis.
   If a tuberculosis infection does become active, it most commonly involves the lungs (in about 90% of cases). Symptoms may include chest pain and a prolonged cough producing sputum. About 25% of people may not have any symptoms (i.e. they remain "asymptomatic").Occasionally, people may cough up blood in small amounts, and in very rare cases, the infection may erode into the pulmonary artery , resulting in massive bleeding. Tuberculosis may become a chronic illness and cause extensive scarring in the upper lobes of the lungs.

2. **EXTRA-PULMONARY TUBERCULOSIS**
   TB can infect any part of the body such as bones, intestine, kidneys, meninges, etc. It occurs in only 15-20% of the active cases.

TUBERCULOSIS CAN BE ACTIVE OR LATENT

Latent tuberculosis (LTB), also called **latent tuberculosis infection** (LTBI) means a patient is infected with *Mycobacterium tuberculosis*, but the patient does not have active tuberculosis. Active tuberculosis can be contagious while latent tuberculosis is not, and it is therefore not possible to get TB from someone with latent tuberculosis. The main risk is that approximately 10% of these patients will go on to develop active tuberculosis.

Active tuberculosis is when a person actually has the disease and can spread it to others.

Those having latent tuberculosis may develop into active TB when their immune system is compromised or when exposed to infectious people.

SIGNS AND SYMPTOMS

- A cough (beginning dry and progressive to productive with possible blood in the sputum)
- Flu-like symptoms
- Fever
- Night sweats
- Extensive weight loss
- Fatigue
- Chest pain
- Shortness of breath

The symptoms of cough and cold will not be present in case of extra-pulmonary tuberculosis.

Some other symptoms such as abdominal pain, difficulty in swallowing, back pain etc .may also be observed.

DIAGNOSIS

A number of tests are available to confirm tuberculosis.

The most common test is the tuberculin skin test or mantoux test.

The Tuberculin Skin Test (TST) in its first iteration, the MantouxTest, was developed in 1908. Conceptually, it's quite simple: tuberculin (also called purified protein derivative or PPD) is a standardised dead extract of cultured TB, injected into the skin to measure the person's immune response to the bacteria. So, if a person has been exposed to the bacteria previously, they should express an immune reaction to the injection, usually a mild swelling or redness around the site.

The Mantoux test is now standardised by the WHO. 0.1 ml of tuberculin (100 units/ml) is given by intradermal injection into the volar surface of the forearm. A waterproof ink mark is drawn around the injection site so as to avoid difficulty finding it later if the level of reaction

is small. The test is read 48 to 72 hours later. The area of induration is measured transversely across the forearm (left to right, not up and down) and recorded to the nearest millimetre.

If this test comes positive, then further investigations are done to confirm for active TB.

The tests used are:

- T-SPOT.TB
- QuantiFERON-TB Gold
- QuantiFERON-TB Gold In-Tube

The above tests are highly sensitive and also expensive so not done until mantoux test is indicating presence of bacterium inside the body.

TREATMENT

If a person is diagnosed with active pulmonary TB (TB that affects your lungs and causes symptoms), you will be given a six-month course of a combination of antibiotics. The usual course of treatment is:

- two antibiotics (isoniazid and rifampicin) every day for six months
- two additional antibiotics (pyrazinamide and ethambutol) every day for the first two months

It may be several weeks or months before you start to feel better. The exact length of time will depend on your overall health and the severity of your TB.

After taking the medicine for two weeks, most people are no longer infectious and feel better. However, it is important to continue taking your medicine exactly as prescribed and to complete the whole course of antibiotics.

Taking medication for six months is the most effective method of ensuring the TB bacteria are killed. If you stop taking your antibiotics before you complete the course, or you skip a dose, the TB infection may become resistant to the antibiotics. This is potentially serious as it can be difficult to treat and will require a longer course of treatment.

If you find it difficult to take your medication every day, your treatment team can work with you to find a solution. This may include having regular contact with your treatment team at home, the treatment clinic, or somewhere else more convenient.

If treatment is completed correctly, you should not need any further checks by a TB specialist afterwards. However, you may be given advice about spotting signs that the illness has returned, although this is rare.

In rare cases TB can be fatal, even with treatment. Death can occur if the lungs become too damaged to work properly.

Extrapulmonary TB (TB that occurs outside the lungs) can be treated using the same combination of antibiotics as those used to treat pulmonary TB. However, you may need to take them for 12 months.

PREVENTING THE SPREAD OF INFECTION

If you are diagnosed with pulmonary TB, you will be contagious up to about two to three weeks into your course of treatment.

You will not normally need to be isolated during this time, but it's important to take some basic precautions to stop TB spreading to your family and friends. You should:

- stay away from work, school or college until your TB treatment team advises you it is safe to return
- always cover your mouth – preferably with a disposable tissue – when coughing, sneezing or laughing
- carefully dispose of any used tissues in a sealed plastic bag
- open windows when possible to ensure a good supply of fresh air in the areas where you spend time
- do not sleep in the same room as other people as you could cough or sneeze in your sleep without realising it.

RESEARCH

A lot of research is going on specially in developing countries to find new drugs and therapies for TB because the bacteria can develop resistance against the antibiotic very quickly and the person can have Drug Resistant Tuberculosis or Multi- Drug resistant tuberculosis. These cases are even more difficult to manage and in most cases turn out to be fatal.

WHO aims to eradicate tuberculosis by 2025.