

# Tuberculous Meningitis: Severe Extra-Pulmonary Manifestation of Tuberculosis

Megha Sharma\*

Department of Surgery, College of Human Medicine, Michigan State University, Michigan, USA

## DESCRIPTION

Tuberculosis (TB) is a bacterial lung infection. Tuberculous Meningitis (TBM) is a complication of tuberculosis in which the bacteria that cause tuberculosis infect the brain and spinal cord as well. TBM inflames the meninges, which are the thin membranes that surround the brain and spinal cord. This condition can cause symptoms such as headache and neurological problems. Delayed treatment or without treatment, the condition can lead to a coma or even death.

## Causes

*Mycobacterium tuberculosis* bacteria cause tuberculosis. The infection primarily affects a person's lungs, though it may also affect areas other than the lungs. Doctors call this condition as "Extrapulmonary TB." TBM is a rare extrapulmonary form of tuberculosis that affects the brain and spinal cord. It accounts only for approximately 1% of extrapulmonary TB cases. According to previous studies, the mechanism by which *Mycobacterium tuberculosis* spreads to the brain is highly complex. The bacteria must first exit the lungs and enter the bloodstream or lymphatic system. It can do so by "Hijacking" other cells or passing through them. The bacteria then pass through the blood-brain barrier and blood-cerebrospinal fluid barriers. Normally, these barriers protect the brain from harmful chemicals and pathogens. The bacteria might face little resistance inside the brain because the brain has a very limited immune response. The bacteria multiplies, resulting in bacteria-filled brain lesions. These lesions eventually rupture, allowing *Mycobacterium tuberculosis* to enter the meninges of the brain.

## Risk factors

TBM does not affect everyone who gets tuberculosis. If TBM occurs, the severity varies from person to person. Experts have identified several risk factors that influence the likelihood and severity of TBM. According to studies, these are as follows:

**Age:** Children aged 2-4 years are at an increased risk of developing tuberculosis infections and developing TBM from those infections.

**HIV:** Adults with HIV are more likely to develop TBM than adults who do not have HIV.

**Malnutrition:** Some evidence suggests that malnutrition may increase a person's risk of developing tuberculosis. People who are vitamin D deficient may be at a higher risk.

**Bacterial strain:** Some *Mycobacterium tuberculosis* strains are more likely to cause extrapulmonary tuberculosis.

**Immunodeficiency:** Immunodeficiency conditions, whether congenital or acquired, as well as immunosuppressive medications, can all increase risk.

## Signs and symptoms

It is critical to distinguish between general TB symptoms and TBM-specific symptoms.

The following are general TB symptoms:

- Chronic cough
- Blood in the sputum
- Weight loss
- Fever
- Night sweats

If TB progresses to TBM, a person will develop additional extrapulmonary symptoms. These may emerge in stages. Over days or weeks, a trusted source may include:

- Headache
- Dizziness
- Vomiting
- General malaise
- Personality changes

More serious symptoms may develop as TBM progresses. Examples include:

- Severe headache
- Neck stiffness
- Confusion
- Altered mental state, which may result in significant behavioural changes.
- Cranial nerve damage

**Correspondence to:** Megha Sharma, Department of Surgery, College of Human Medicine, Michigan State University, Michigan, USA, E-mail: meghabutolia@gmail.com

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- Difficulty controlling the body
- Coma
- Seizures
- Weakness, including loss of power in specific limbs
- Sensation loss
- Without treatment, TBM is fatal.

## Diagnosis

A Cerebro Spinal Fluid (CSF) analysis is required to diagnose TBM trusted Source. A needle is inserted between the lower spine vertebrae and a sample of CSF is drawn for laboratory analysis. The analysis will assist doctors in determining whether a person has meningitis and whether it is TBM. If CSF analysis is not possible, but the doctor has a strong clinical suspicion of TBM, treatment for TBM may be initiated. MRI and other imaging techniques may also be used by doctors to aid in the diagnosis.

## Treatment

TBM is treated in the same way as other types of meningitis. Antibiotics such as:

- Isoniazid
- Rifampin
- Streptomycin
- Ethambutol

Will be prescribed by a doctor. Antibiotic treatment is typically continued for 9-12 months. Corticosteroid medications will also be prescribed by doctors to reduce inflammation and swelling of the meninges.

## CONCLUSION

TBM is a severe extrapulmonary manifestation of tuberculosis. *Mycobacterium tuberculosis* infects the brain and spinal column in TBM, causing inflammation of the meninges. TBM is fatal if not treated. Antibiotic treatment, both early and prolonged, can help reduce the risk of complications. Treatment of Tuberculosis (TB) before the bacterium enters the bloodstream and crosses the blood-brain barrier is the most effective way to help prevent TBM. Anyone experiencing TB or TBM symptoms should contact their doctor right away, especially if they are in a high risk group. Young children, elderly people, and people living with HIV are all examples.