Mycobacterial Diseases
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Perspective

Epidemiology and Clinical Manifestations of *Mycobacterium tuberculosis*

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DESCRIPTION

Microbiology

Tuberculosis (TB) is caused by one of several mycobacterial species. *Mycobacterium tuberculosis*, *Mycobacterium africanum*, and *Mycobacterium bovis* are the human pathogens. *Mycobacterium. microti*, the other member of the complex, is a rodent pathogen.

Epidemiology

Mycobacterium tuberculosis is the most dangerous human pathogen. Recent genomic sequence analysis of *Mycobacterium tuberculosis* isolates from around the world suggested that the *Bacillus* first appeared around 70,000 years ago and accompanied migrations of anatomically modern humans out of Africa. *Mycobacterium tuberculosis* is thought to infect roughly one-third of the world's population, or 2 billion people. Tuberculosis infected 9 million people in 2013, with an estimated incidence of 126 cases per 100,000 populations. From 2000 to 2013, the number of reported incidents decreased at a 1.5% annual rate. Tuberculosis rates differed significantly between high and low burden countries. In South Africa, the estimated TB incidence was as high as 860 cases per 100,000 people. The incidence rate of tuberculosis in the United States fell to 3.0 cases per 100,000 population, 64.6% of tuberculosis cases occurred among foreign-born people, and the incidence rate was 13 times higher than that of U.S-born people. Foreign-born children and US-born children with foreign-born parents had tuberculosis rates that were 32 and 6 times higher, respectively, than US-born children with US-born parents. Tuberculosis is the world's second most lethal infectious disease, trailing only HIV/AIDS with 1.5 million deaths. Furthermore, the syndemic of HIV/tuberculosis co-infection has grown as a result of significant sociogeographic overlaps between the two epidemics. TB is the leading cause of death in HIV-positive people, accounting for 25% of all HIV-related deaths.

The majority of tuberculosis cases are pulmonary, with only 17% occurring at an extrapulmonary site. However, once the CD4 count falls below 100 cells/ml, up to 70% of HIV-1 infected patients will develop extrapulmonary disease or mycobacteremia. Co-infected individuals are more likely to present atypically, potentially delaying tuberculosis diagnosis.

Central nervous system tuberculosis

Tuberculosis of the central nervous system can manifest as tuberculosis of the meninges, tuberculomas, or tuberculous spinal meningitis. It accounts for 5% of extrapulmonary tuberculosis cases. It is most common in young children. The main precipitating cause is thought to be the rupture of a subependymal tubercle into the subarachnoid space. The most noticeable location is at the base of the brain. *Mycobacterium tuberculosis* vasculitis of local arteries or veins can cause aneurysms, thrombosis, and focal haemorrhage infarction. Movement disorders may result from perforating vessel involvement in the basal ganglia and pons. Hemiparesis can be caused by vasculitis of the branches of the middle cerebral artery. The clinical spectrum of tuberculous meningitis ranges from chronic headaches and subtle mental status changes to severe meningitis that progresses to coma. Within 2 to 3 weeks, a prodrome of malaise, intermittent headache, and low grade fever can be followed by protracted headache, vomiting, confusion, meningismus, and focal neurologic signs. If left untreated, stupor, coma, seizures, and hemiparesis can occur within five to eight weeks of illness onset. Fever does not always occur, and the peripheral white blood cell count is usually within normal limits. Patients may experience mild anaemia or hyponatremia as a result of insufficient antidiuretic hormone secretion. Paresis of cranial nerves, particularly the ocular nerves, is a common finding. Three-quarters of cases have concomitant extrameningeal tuberculosis, and 50% have abnormalities on chest X-ray.

Pericardial tuberculosis

Pericardial tuberculosis is typically caused by infection spreading from a nearby site of infection, such as the mediastinal or hilar nodes, the lung, spine, or sternum. Miliary tuberculosis can cause pericardial dissemination. The onset can be sudden or gradual. Dyspnea, orthopnea, dull retrosternal pain, pericardial friction rub, or symptoms and signs of cardiac tamponade may be present. Fever, weight loss, and night sweats are common

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before cardiopulmonary symptoms. A few patients are found to have chronic constrictive pericarditis. A pleural effusion can be found in up to 39% of pericardial tuberculosis cases, and radiographic evidence of concurrent pulmonary tuberculosis can be found in 32%-72% of cases.

CONCLUSION

Tuberculosis must be treated with at least two drugs that are effective against the isolate. The drugs used will determine the duration of the treatment regimen, expected drug toxicities, and overall effectiveness. Currently, the United States Food and Drug Administration (FDA) has approved 11 drugs to treat tuberculosis. Fluoroquinolones and rifabutin, two drugs commonly used to treat drug-resistant tuberculosis and HIV-related tuberculosis, respectively, do not have FDA approval for tuberculosis treatment.