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Commentary

Advancements in tuberculosis: Risk factors and prevention

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DESCRIPTION

The bacteria *Mycobacterium tuberculosis* is the primary cause of the chronic infectious illness Tuberculosis (TB). It has been a major public health concern for centuries, affecting millions of people worldwide. This article provides an overview of tuberculosis (Bannon., 1999), exploring its causes, transmission, symptoms, diagnosis, treatment, and the global efforts to combat this disease (Chadha., 2009).

Causes and transmission

Mycobacterium tuberculosis, the bacterium responsible for tuberculosis (Davies., 2000), primarily affects the lungs but can also invade other parts of the body, such as the kidneys, spine, and brain. The disease is primarily transmitted through the airborne route. When an infected person coughs, sneezes, or talks, tiny droplets containing the bacteria are released into the air. If a susceptible individual inhales these droplets, they can become infected with tuberculosis.

Risk factors

Several factors increase the risk of developing tuberculosis. These include:

Weakened immune system: People with compromised immune systems, such as those living with HIV/AIDS, malnutrition, or certain medical conditions, are more susceptible to tuberculosis (Diwan et al., 1999).

Close contact: Spending significant time with an infected individual increases the chances of transmission.

Overcrowded and unsanitary living conditions: Poor ventilation, crowded spaces, and inadequate access to healthcare contribute to the spread of tuberculosis.

Age: Although tuberculosis can affect individuals of all ages, young children and the elderly are more vulnerable to severe forms of the disease.

Symptoms

The symptoms of tuberculosis can vary depending on the site of infection and the overall health of the individual. Pulmonary tuberculosis, the most common form, presents symptoms such as persistent cough, coughing up blood, chest pain, fatigue, weight loss, and night sweats. Other forms of tuberculosis, such as extrapulmonary tuberculosis, can manifest with symptoms related to the affected organs, such as back pain in spinal tuberculosis or urinary symptoms in renal tuberculosis (Dye., 2006; Kabra et al., 2004).

Diagnosis

The diagnosis of tuberculosis involves a combination of clinical evaluation, imaging tests, and laboratory tests. The most common diagnostic tool is the tuberculin skin test, also known as the Mantoux test, which involves injecting a small amount of Purified Protein Derivative (PPD) under the skin and checking for a reaction. Another method is the interferon-gamma release assay (IGRA), which measures the immune response to specific tuberculosis antigens (Kochi., 1991; Rattan et al., 1998). Additionally, chest X-rays, sputum tests, and molecular diagnostic techniques, such as Polymerase Chain Reaction (PCR), can aid in confirming the diagnosis.

Treatment

Treating tuberculosis involves a combination of antibiotics for an extended period. The most commonly used drugs include isoniazid, rifampicin, pyrazinamide, and ethambutol. This combination therapy, known as Directly Observed Treatment Short-course (DOTS), is highly effective in curing tuberculosis and preventing the development of drug resistance. It is crucial to complete the entire treatment course to ensure successful eradication of the bacteria. Failure to complete the treatment can result in drug-resistant strains, which are more challenging to treat and pose a greater risk to

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public health.

Global impact and efforts to combat tuberculosis

Tuberculosis remains a significant global health challenge, particularly in low- and middle-income countries. According to the World Health Organization (WHO), an estimated 10 million people fell ill with tuberculosis in 2020, and 1.5 million died from the disease. TB is one of the leading causes of death worldwide, particularly among individuals co-infected with HIV (Rundi., 2010).

Efforts to combat tuberculosis are focused on multiple fronts. International organizations, governments, and non-governmental organizations are working together to improve access to diagnosis and treatment, strengthen healthcare systems, and raise awareness about tuberculosis prevention and control. The WHO's End TB Strategy aims to reduce tuberculosis deaths by 95% and new cases by 90% by 2035.

Additionally, research and development efforts are underway to develop new diagnostic tools, more effective drugs, and a tuberculosis vaccine. The Bacillus Calmette-Guérin (BCG) vaccine, although not fully protective against adult pulmonary tuberculosis (Spence et al., 1993), is widely used in many countries to prevent severe forms of the disease in children.

CONCLUSION

Tuberculosis continues to pose a significant global health burden, affecting millions of individuals and causing numerous deaths each year. It is a complex disease that requires a comprehensive approach involving prevention, diagnosis, and treatment. International collaboration, increased funding, and improved healthcare infrastructure are essential to control the spread of tuberculosis and reduce its devastating impact on individuals, communities, and economies. With continued efforts and advancements in research, it is hoped that tuberculosis can be effectively controlled and ultimately eradicated, leading to a healthier and tuberculosis-free world.

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