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The Ongoing Challenge of Latent Tuberculosis- A Over View

Nursing

KEYWORDS :

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Introduction

The global health community has set itself the task of eliminating tuberculosis (TB) as a public health problem by 2050. Tuberculosis (TB) is estimated to affect about a third of the world's population. However, only a small proportion of those affected manifest active TB. Rest of the affected population remain in a state of sub-clinical disease with no manifestation (latent TB infection) but have the potential for reactivation of the lesion to develop active TB in future. While the risk of developing active TB in people with latent TB is only about 10%, certain groups are at higher risk.

"One-third of the world's burden of tuberculosis (TB), or about 4.9 million prevalent cases, is found in the World Health Organization (WHO) South-East Asia Region.

"About one-third of the world's population has latent TB, which means people have been infected by TB bacteria but are not (yet) ill with disease and cannot transmit the disease,and most of those cases are in developing countries.

TB

Tuberculosis (TB) is a disease caused by a germ called Mycobacterium tuberculosis that is spread from person to person through the air. TB usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys, or the spine. When a person with infectious TB coughs or sneezes, droplet nuclei containing M. tuberculosis are expelled into the air. If another person inhales air containing these droplet nuclei, he or she may become infected. However, not everyone infected with TB bacteria becomes sick. As a result, two TB-related conditions exist: latent TB infection and TB disease.

What is Latent TB Infection

About 90% of people who get infected with TB develop a latent TB infection, which means the infecting bacteria are alive in the body, but inactive. People who have latent infections do not have TB symptoms and cannot spread the infection to others, but they are at risk of developing an active infection that is both symptomatic and contagious. About 3% to 5% of latent TB become active TB in the first year, and about 5-15% after that

A person with latent TB infection
• Usually has a skin test or blood test result indicating TB infection
• Has a normal chest x-ray and a negative sputum test
• Has TB bacteria in his/her body that are alive, but inactive
• Does not feel sick
• Cannot spread TB bacteria to others
• Needs treatment for latent TB infection to prevent TB disease; however, if exposed and infected by a person with multidrug-resistant TB (MDR TB) or extensively drug-resistant TB (XDR TB), preventive treatment may not be an option

How Does One Get Latent Tuberculosis and Active Tuberculosis

Getting Latent Tuberculosis

"TB Bacteria Are Spread Only from a Person with Active TB Disease ... In people who develop active TB of the lungs, also called pulmonary TB, the TB skin test will often be positive. In addition, they will show all the signs and symptoms of TB disease, and can pass the bacteria to others.

From Latent Tuberculosis to Active Tuberculosis

Once a person has been diagnosed with Latent Tuberculosis (LTBI) and a medical doctor confirms no active tuberculosis, the person should remain alert to symptoms of active tuberculosis for the remainder of his or her life. Even after completing the full course of medication, there is no guarantee that the tuberculosis bacteria have all been killed.

"When a person develops active TB (disease), the symptoms (cough, fever, night sweats, weight loss etc.) may be mild for many months. This can lead to delays in seeking care, and results in transmission of the bacteria to others."

Symptoms include:

- a cough (beginning dry and progressive to productive with possible blood in the sputum)
- flu-like symptoms
- fever
- night sweats
- weight loss
- fatigue
- other symptoms such as chest pain, shortness of breath etc.

Tests for latent tuberculosis

There are currently two major classes of tests used to identify patients with latent tuberculosis: tuberculin skin tests and IFN-γ (Interferon-gamma) tests. The tuberculin skin tests in use include (but are not limited to)

- Mantoux test
- Heaf test
- Tine test (often misspelled as tyne)

There are currently three IFN-γ (interferon-gamma release assay - IGRA) tests available.

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

In persons with LTBI, the chest radiograph is usually normal

- Sputum Examinations

Sputum examination is not indicated for most persons being considered for treatment of LTBI.

Pretreatment Evaluation and Monitoring of Treatment (AmericanThoracic Society)

Pretreatment evaluation.

The pretreatment evaluation of persons who are targeted for treatment of LTBI provides an opportunity for health care providers to (I) establish rapport with patients, (2) discuss the details of the patients' risk for TB, (3) emphasize the benefits of treatment and the importance of adherence to the drug regimen, (4) review possible adverse effects of the regimen, including interactions with other drugs, and (5) establish an optimal follow-up plan.

Who should receive treatment for LTBI?

Regardless of age, persons who fall into one or more of the following high-risk categories with a positive skin test, and who have not previously received treatment, should be treated unless contraindicated (see below):

- close contacts of a person with infectious TB (TST considered positive with ^{3} 5mm induration)
- persons with HIV infection (TST considered positive with ^{3} 5mm induration)
- organ transplant patients, or patients with other immunosuppressive disorders (TST considered positive with ^{3} 5mm induration)
- persons whose chest x-ray shows stable fibrotic lesions consistent with old, healed MTB and a history of inadequately treated TB or no prior history of treatment for TB (TST considered positive with ^{3} 5mm induration)
- injection drug users
- persons with clinical conditions that make them high-risk, e.g. diabetes mellitus, certain forms of cancer, silicosis, end-stage renal disease, substance abusers
- recent tuberculin skin test converters (^{3}10mm increase within the past two years)
- persons born in countries where TB is common
- mycobacteriology laboratory personnel
- residents and employees of high-risk congregate settings
- children younger than 4 years of age
- children and adolescents exposed to adults in high-risk groups
- persons with recent travel to an area with high rates of TB

Treatment for Latent TB Infection

Treatment of latent TB Infection greatly reduces the risk that TB infection will progress to TB disease. Certain groups are at very high risk of developing TB disease once infected. Every effort should be made to begin appropriate treatment and to ensure completion of the entire course of treatment for latent TB infection.

The recommended treatment regimen for LTBI

Treatment of latent TB infection should be initiated after the possibility of TB disease has been excluded. Once the diagnosis of latent TB infection has been made, health care providers must choose the most appropriate and effective treatment regimen.

The four treatment regimens use isoniazid (INH), rifapentine (RPT), or rifampin (RIF). Treatment must be modified if the patient is a contact of an individual with drug-resistant TB. Consultation with a TB expert is advised if the known source of TB infection has drug-resistant TB.

Table 1. Latent TB Infection Treatment Regimens

Drugs	Duration	Interval	Minimum doses
Isoniazid	9 months	Daily	270
		Twice weekly*	76
Isoniazid	6 months	Daily	180
		Twice weekly*	52
Isoniazid and Rifapentine	3 months	Once weekly*	12
Rifampin	4 months	Daily	120

***Use Directly Observed Therapy (DOT)**

The alternate short-course regimens are strictly second-line recommendations and should not be used routinely in place of the isoniazid regimens.

- persons with active hepatitis
- persons with end-stage liver disease
- pregnancy (therapy is usually delayed until after delivery)
- major adverse medication reactions
- previous adequate treatment for LTBI or active disease

Recommendations

Implementation Of Targeted Tuberculin Testing

- Decision to Tuberculin Test Is Decision to TREAT
- Targeted tuberculin testing programs should be designed for one purpose: to identify persons at high risk for TB who would benefit by treatment of LTBI. Following that principle, targeted tuberculin testing programs should be conducted among groups at risk for recent infection with M. tuberculosis and those who, regardless of duration of infection, are at increased risk for progression to active tuberculosis..

Identification and Access to High-risk Groups

- A flexible approach to identifying high-risk groups is recommended, and state and local public health agencies are encouraged to analyze their TB case reports and data obtained from tuberculin skin testing to identify high-risk groups based on local trends in the epidemiology of TB. Thus designing and conducting skin-test-screening surveys to determine whether population groups are at high risk for TB may be desirable. Populations at risk can be accessed at HIV treatment facilities, drug treatment centers, homeless shelters, community health centers .

Role of the Health Department

In this community-based approach to targeted testing and treatment of LTBI, the health department TB program should be instrumental in planning and coordination, setting performance standards, and overseeing quality of service. The health department is responsible for assessing the community's TB problem, identifying high-risk groups based on the local epidemiology of TB, and ascertaining the sites of most convenient access to those groups. In addition, the health department should assume responsibility for organizing the communitybased approach, recruiting health professionals, , educating such professionals about TB, and motivating them to institute targeted testing and treatment programs.

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Priorities for Future Research

The only widely available method to detect LTBI is the tuberculin skin test. However, the specificity of the test is decreased by cross reactions from BCG vaccination and sensitization by nontuberculous mycobacteria. Thus, more specific and sensitive tests are needed to diagnose LTBI and to identify persons at greatest risk for progressing to active disease. Especially useful would be tests that distinguish skin-test reactions caused by TB infection from those caused by BCG vaccination or infection with nontuberculous mycobacteria, tests that correlate with the presence of living organisms, and tests that accurately identify LTBI in immunodeficient persons.

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