

LTBI Videos-Diagnosis

This program is presented by the Global Tuberculosis Institute and is based on recommendations from the Centers for Disease Control and Prevention. This is the second in a series of videos for community health providers. In this video, you'll learn about diagnosing latent TB infection, also called LTBI. Other videos discuss the screening and treatment of latent TB infection.

Tuberculosis, also called TB, is spread from person to person through the air. People who have pulmonary or laryngeal TB disease can spread infectious particles into the air when they cough, sneeze, shout or sing. Infection occurs when another person inhales these particles, and they reach the alveoli of the lungs.

TB infection is diagnosed based on a number of factors: a patient's medical history, test result for TB infection, chest radiograph, physical exam, and in certain circumstances, results of a sputum sample. If a person tests positive for TB infection, you must rule out TB disease, before beginning treatment for TB infection. Remember, treating a patient for TB infection when they really have TB disease can lead to poor outcomes, including drug resistance.

TB Infection and TB Disease

There are many important differences between latent TB infection and TB disease. The most significant difference is that someone with TB infection has *no* symptoms and cannot spread bacteria to others. Although they test positive for TB infection, their chest radiograph is normal and sputum specimens are smear and culture negative.

Someone with TB disease usually *does* have symptoms. Symptoms may include fever, cough, chest pain, weight loss, night sweats, hemoptysis, fatigue and loss of appetite. The test for TB infection may be positive and the chest radiograph is usually abnormal. Sputum specimens are usually smear and culture positive.

Testing Methods

There are 2 approved testing methods available to detect TB infection in the US. The first is the Mantoux tuberculin skin test, also called the TST. The second is the Interferon-Gamma-Release Assay, also called IGRA. These tests help differentiate people who are infected with TB and those who aren't. However, a negative reaction to either of these tests, doesn't exclude the diagnosis of TB infection or TB disease. Consider the complete clinical and epidemiologic information, particularly for high-risk populations, such as people living with HIV.

Testing Methods: TST

When administering a TST, ask the individual if he or she has had any symptoms of TB disease, and record any symptoms. A small amount of tuberculin fluid is then injected intradermally in the patient's lower arm. The patient must return within 48 to 72 hours for an examination of any reaction. Look for a raised, hard area, called an induration, and measure its size with a millimeter ruler, ignoring any redness. Repeat a TST that wasn't properly measured and recorded in millimeters.

Skin tests are interpreted based on several different factors. These factors are

- 1) The size of the induration in millimeters,
- 2) The person's risk of getting TB infection, and
- 3) The risk of progression to TB disease if infected.

People with a high risk of progressing to TB disease are considered positive if the induration is 5 or more millimeters. These include people living with HIV; people in recent contact with those with infectious TB disease; people whose chest radiographs recently changed from negative to positive; people taking or about to start TNF-alpha blockers, and those who are immunosuppressed, such as organ transplant patients.

Others are considered positive if the induration is 10 or more millimeters. These include recent arrivals from certain regions of the world; injection drug users; people who work in mycobacteriology labs and people with other medical conditions that increase their risk of progression to TB disease. These medical conditions include silicosis, diabetes, chronic renal failure, certain cancers, gastrectomy or jejunoileal bypass and weight loss. Other groups considered positive at 10 or more millimeters are residents or employees of high-risk settings, such as correctional facilities, hospitals and other health care facilities and homeless shelters. All children younger than 4, and children and adolescents exposed to high-risk adults, such as immigrants from TB-endemic countries, are also considered positive at 10 millimeters or more.

Otherwise, people with no known risk factors for TB infection are considered positive if the induration is 15 or more millimeters.

TST results can be affected by the immune system. Even people with TB disease may have a negative TST reading, for example, because their immune system is compromised.

Testing Methods: IGRA

IGRAs are the second test for diagnosing TB infection. 2 types of IGRAs are available: Quantiferon-TB Gold-in Tube, or QFT, and the T-Spot TB. Both measure the immune response to TB proteins in blood. If someone is infected with TB bacteria, the white blood cells release interferon-gamma. Tests results are based on the amount of interferon-gamma released.

IGRAs have several advantages over TSTs. They require only 1 office visit and results may be ready in 24 hours. IGRAs are easier to interpret and are not affected by either the BCG vaccine or the booster effect, which we'll talk about shortly.

However, IGRAs have some limitations. The blood sample must be processed within 8 to 30 hours. Also, there's limited data about the test in children younger than 5, people who are immunocompromised, and those who are tested repeatedly. Results are reported in two ways. They can be positive, negative or indeterminate, and are also given quantitatively.

It's unnecessary to test someone if they have *written* proof of a previously positive test result or treatment for TB.

It's important to use the appropriate test. Use IGRAs for people who are unlikely to return to have their TST read, and those who had the BCG vaccine. Use TSTs for children under age 5. Either test can be used for others, but it's not recommended to use both tests together for diagnosis.

Special Considerations

When testing for TB infection, also consider the BCG vaccine, HIV infection and the booster effect.

The BCG vaccine is currently given in many parts of the world where TB is common. It's used to protect infants and young children from serious complications of TB disease. The vaccine isn't given in the US. Disregard BCG vaccination when testing for TB infection. IGRAs are not affected by BCG, and are the preferred test for those who received BCG, either as a vaccine or for cancer therapy.

It's critical that people living with HIV be tested for TB infection. Test for each known exposure to TB. Repeat TB testing after an HIV-infected patient has started antiretroviral therapy.

Finally, the booster effect can occur when someone infected with TB years ago, has 2 skin tests within 1 year of each other. Even though the first test may have

been negative, the second has a positive reaction, because the first test boosted the immune response.

For this reason, a two-step testing method is recommended for the skin testing of people who will be tested periodically, such as health care workers. If the first test result is negative, repeat the skin test in 1 to 3 weeks. Consider the person uninfected only if both tests are negative. The booster effect is not a concern with IGRAs, and thus repeat testing is unnecessary when using IGRAs.

In cases where you need to repeat a test, use the same test. For example, if you use a TST for the first test, use the same method for the second. A second test may be needed for “contacts,” that is, people who were recently exposed to someone with infectious TB. All contacts whose first test is negative, should be re-tested 8 to 10 weeks after their last exposure to an infectious TB case. This is because it can take 2 to 8 weeks for the immune system to respond and TB infection to be detected.

Skin tests are safe and reliable for pregnant patients. However, as with any individual, only test if risk factors are present. Get a chest radiograph if the test is positive, and use proper shielding.

Medical Evaluation

Conduct a physical exam and get a medical history for all patients you are assessing for TB infection. The medical history should include information about past TB test results and treatment. Get a chest radiograph to distinguish between TB infection and TB disease. Get a chest radiograph for someone who has a positive test result for TB infection. Get a chest radiograph even for someone with a negative test, but who has symptoms consistent with TB disease, or for children under 5 and immunocompromised persons. Get posterior to anterior and lateral views for children under 5. For others, a posterior to anterior view is adequate. If the chest radiograph is normal, and there aren't any symptoms, then diagnose the patient with latent TB infection.

If a person has either an abnormal chest radiograph or respiratory symptoms, such as cough, obtain at least 3 sputum samples for testing. Send the sputum samples to the lab for AFB and smear culture. Sputum samples should be collected at least 8 hours apart, and one should be collected in the early morning. If you diagnose someone with TB disease, you must notify your local or state health department.

Thank you for viewing this video on diagnosing latent TB infection, which is the second in a series. The other videos discuss screening and treatment. For more

information, visit this website
(www.umdnj.edu/ntbweb/products/lbimultimedia.htm).