



TUBERCULOSIS

LADD

BASIC INFORMATION

Tuberculosis (TB) is an acute or chronic contagious, bacterial infection. TB involves the lungs primarily, but may spread to other organs. Childhood tuberculosis is usually confined to the middle of the lungs, but it may spread to cause meningitis. Tuberculosis in adults usually affects the top of the lungs. TB was once under control, but has resurfaced mainly due to AIDS, poverty, homelessness and abuse of alcohol and other drugs.

FREQUENT SIGNS AND SYMPTOMS

EARLY STAGES:

- No symptoms (often)
- Symptoms that resemble those of influenza

SECOND STAGES:

- Low fever
- Weight loss
- Chronic fatigue
- Heavy sweating, especially at night

LATER STAGES:

- Cough with sputum that becomes progressively bloody, yellow, thick or gray
- Chest pain
- Shortness of breath
- Reddish or cloudy urine

CAUSES:

Infection by the germ, *Mycobacterium tuberculosis*. The germ is transmitted in the air from one

person to another. Cattle are also susceptible, and can transmit TB through non-pasteurized milk.

RISK INCREASE WITH:

- Adults over 60
- Newborns and infants
- Chronic illnesses that has lowered resistance.
- Use of cortisone or immunosuppressive drugs. These may reactivate inactive TB
- Crowded or unsanitary living conditions.
- Alcohol and/or drug abuse
- AIDS

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NOTIFY the LADD OFFICE IMMEDIATELY IF:

- You or a family member has symptoms of TB
- Symptoms persist or worsen, despite treatment
- New, unexplained symptoms develop. (Drugs used in treatment may produce side effects)

PREVENTIVE MEASURES

TB can be vaccinated against with BCG, a strain of the TB bacteria. This may prevent infection, or shorten and diminish the severity of the infection

Preventive treatment may be necessary for several months (with isoniazid IINH) if a tuberculin skin test is positive. Health authorities recommend vaccination and preventive treatment for the following group:

Persons who have positive reactions to TB test, but show no symptoms of disease, especially children under age 5.

Children with negative reactions to TB tests in areas where 20% or more of classmates have

positive reaction.

Persons traveling to countries where TB is prevalent

Persons who must take immunosuppressive or cortisone drugs for a long time.

Post gastrectomy patients whose x-rays show evidence of inactive TB.

Persons with silicosis

EXPECTED OUTCOME:

TB is usually curable with treatment. Without treatment, it can be fatal. However, recurrent

strains have resistance to usual antibiotics.

POSSIBLE COMPLICATIONS:

Lung abscess

Bronchiectasis

Chronic obstructive pulmonary disease

Spread of infection to other organs (brain, bone, spine and kidneys)

TREATMENT

General Measures

Diagnostic tests may include tuberculin skin test, laboratory blood studies, sputum study and chest x-rays. If other disorder suspected, may do a lumbar puncture, bronchoscopy and bone marrow biopsy.

It may be necessary to isolate or hospitalize a person with TB. The disease is usually spread before diagnosis. Patients are probably not infectious after 10 days to 2 weeks of treatment.

Occasionally you will need to collect a 24-hour sputum specimen for laboratory analysis

to see if TB is still active.

Regular follow-up x-rays.

Additional information available from the American Lung Association, 1740 Broadway, New York, NY 10019, (800)586-4871

MEDICATION

Medication may include anti-tubercular drugs, usually for 9-12 months. Several types are given at the same time to avoid bacterial resistance to drugs.

ACTIVITY

If infected with TB, patients are told to rest in bed until symptoms disappear and test show TB germs are gone. Activities may be restricted for 6 months.

DIET

No special diet

TB and the HIV-POSITIVE PERSON

This discussion provides health care professionals with the information needed to identify, assess and treat the patient with TB, as well as information on how to prevent transmission of the disease.

LEARNING OBJECTIVES:

Upon completion of this discussion, healthcare professionals will be able to:

Identify current epidemiological factors associated with *M. tuberculosis*.

Identify the mode of transmission of *M. tuberculosis*.

Choose a correct indicator of a positive response to TB screening

Identify the usual multi-drug regimen for treating TB

1. Identify appropriate measures to prevent transmission of TB.

PROGRAM GUIDE

Not too long ago, TB like small pox, typhoid and cholera was considered a disease of the past in this country. With the advent of anti-Tb drugs, the number of Tb cases had steadily declined from more than 84,000 in 1953 to a low of 22,000 in 1984, and public health officials expected the disease would be eradicated by the early part of the next century. Then, just when it was assumed that medicine was winning the battle against the disease, reports of new cases began to increase at an alarming rate. Tuberculosis was once again on the rise. In 1991, there were more than 26,000 new cases in the United States.

A number of factors contribute to the rise of

TB-complacency: cuts in government funded public health programs, urban crowding, poverty, homelessness, drug abuse and immigration from countries with high rates of TB. The AIDS epidemic, which began in the early 1980's added to increasing TB rates. Because HIV suppresses the body's immune system, those infected with the virus were particularly susceptible to contracting TB. Even more alarming: the emergence of new strains of TB that are resistant to many of the drugs traditionally used to treat the disease. TB is once again a major health concern.

Most of the nurses and physicians in hospitals today were trained when TB was considered

no longer a threat. Now they must develop a renewed awareness of the disease-including how it's transmitted, how it's diagnosed, and how to prevent it-as they deal with this new occupational hazard. Because they're on the hospital front lines, healthcare workers today, who may have never given it a thought, have to learn to "think" TB. This new consciousness begins with knowing how the disease is transmitted and recognizing patients who may be at increased risk for TB.

TB INFECTION RATES:

Although TB can affect all parts of the body, it is primarily a disease of the respiratory tract involving the bronchi and the lungs. It is transmitted through the air by respiratory secretion.

When someone infected with TB coughs, sneezes, speaks or sings, the TB bacteria (*Mycobacterium tuberculosis*-an acid-fast aerobic bacterium) are carried through the air in microscopic droplets (droplet nuclei). The bacteria are very small-only one to five microns wide. They ride easily on the air currents. When others breathe the contaminated air, the tubercle bacilli are inhaled and settle

down into the lungs, where they establish a local infection.

Within two to ten weeks, a normal healthy immune system will generally halt the multiplication of the bacilli. In only about one to ten percent of the cases will the infection quickly progress to clinical illness. In others, the bacilli can remain dormant, and they may develop active infection after many years. The likelihood of transmitting the infection depends largely on the concentration of droplets in the air. Close and prolonged contact with someone with undiagnosed or untreated pulmonary TB in small, poorly ventilated areas

produces the greatest risk.

EPIDEMIOLOGY

TB remains a disease strongly linked to poverty, with higher incidence among poorer Blacks, Hispanic, Native Americans and Alaskan natives and Latin Americans. But perhaps the greatest concentration of people with TB remains those infected with HIV.

RISKS

For health care workers, the potential risk of transmission in the health care setting depends upon the patient population, the type, frequency, duration and the closeness of contact with patients. Waiting rooms, emergency rooms and other areas where patients with undiagnosed or untreated Tb infections may be cared for hold a significant potential risk.

Healthcare workers involved in procedures that may generate airborne respiratory secretions (for example, bronchoscopy, aerosolized treatments, sputum induction and suction pro-

cedures) are also at significant risk of exposure, as are those who have direct contact in an enclosed area with infectious TB patients or repeated prolonged contact with patients in high-risk groups prior to respiratory assessment.

PREVENTING TRANSMISSION

It is important that patients with active pulmonary TB be identified and isolated as quickly as possible. Any patient exhibiting suspicious respiratory symptoms should be given a mask to wear, separated from the other patients, and placed in an isolation room, if available, until a diagnosis can be made. All health care professionals should also protect themselves with appropriate face masks or respirators to prevent inhaling potentially infectious airborne droplets.

SCREENING FOR TB

Screening for Tb begins with a patient history including

Past or recent exposures to active pulmonary TB

Any previous TB infections

Any positive skin test for TB

The identification of risk status.

A physical examination with special attention to the chest and lungs will be performed.

TUBERCULIN SKIN TEST

A TB skin test using a purified protein derivative (the PPD skin test) is an important routine aid; though it is not 100% accurate.

In patients who are otherwise healthy, an induration of 10mm or larger is considered a positive indication of TB infection. For patients in high-risk groups, skin measuring of 10mm or larger is deemed positive, while in HIV-infected patients and

those who have had close recent contact with a person with infectious TB, an induration of 5mm or larger is a positive response.

A negative skin test, however, does not absolutely rule out TB or TB infection. For instance, in patients with HIV infection, because they are immunosuppressed, the skin test may be falsely negative. They could have the active infection but the test may not show them as positive. The further the HIV infection has progressed, the more likely a false negative reaction to the skin test.

PREVENTING TRANSMISSION CONT.

With the return of TB and the increase in TB-infected patients among hospital populations, proper infection control in the healthcare settings is vital. Nurses and other health care workers must protect themselves and their other patients against the disease.

Since the infectious TB bacilli are transmitted via the airborne route in the form of droplet nuclei, the principal protective equipment is a high-efficiency mask or disposal particulate respirator.

All mask and respirators should fit snugly over the mouth and nose.

Health care workers should always wear masks or respirators:

When coming in direct contact with or enter-

ing the room of any patient with diagnosed or even suspected active, infectious pulmonary TB.

When entering a respiratory isolation area occupied by a known or suspected active infectious patient with TB.

While performing high-risk procedures on patients who may have active TB, such as aerosol medication administration, bronchoscopy, sputum collection, suction procedures and autopsies.

When transporting patients with active infectious TB.

The infectious patient with active TB must also wear a mask or particulate respirator whenever he or she leaves the room for a specific purpose to diagnosis or therapy. Teach the patient to always cover the mouth and nose when coughing or sneezing.

Generally, patients with TB can come out of isolation when there is a response to drug treatment indicated by **three negative sputum smears on three consecutive days** and reduction in signs and symptoms, such as coughing and fever.



OTHER DIAGNOSTIC TESTS

Other diagnostic tests need to be done to confirm active TB.

Chest x-rays can be used to look for patches of active of TB infection in the lungs and also lymphadenopathy. In HIV patients, the patches of active TB could appear in other locations of the chest. Occasionally, a chest x-ray may appear normal even though there is active TB.

Sputum smears collected from patients suspected of having pulmonary TB are checked for the presence of acid-fast bacilli (AFB). Sputum must be from the lungs, not saliva. Early-morning specimens generally contain the most organisms.

Positive smears will show up in 50% to 80% of patients with the disease, but a negative smear does not exclude the possibility of TB. Patients may have negative sputum smears but the sputum cultures may be positive. Normally, it takes 3 to 6 weeks to obtain results of

sputum cultures for AFB. HIV patients with pulmonary TB are less likely to have positive smears, which is consistent with the lower frequency of cavitary pulmonary disease.

Although dormant, TB infection can be detected by skin tests; active, contagious TB is diagnosed by a chest x-ray and other diagnostic measures such as sputum smears and cultures.

TREATMENT

The traditional treatment for active TB is a combination of drugs taken each day for 6 to 9 months. Because untreated TB can be fatal, patients even suspected of having active TB must undergo the multi-drug treatment until active disease is ruled out. Generally, the treatment consists of at least 3 oral drugs taken for 2 months, followed by 2 oral drugs for another 4 months. HIV-infected patients are usually treated for a longer time period.

STAFF EXPOSURE TO TB

With the increase of TB patients in our hospitals particularly those with multi-drug resistant TB, it is essential that health care professionals be screened for infection periodically. Those who jobs bring them in frequent contact with patients who have TB or those involved in procedures that may produce airborne respiratory secretions should have a PPD skin test every 6 months. Others should be tested annually.

In workers who have had BCG vaccinations against TB, the vaccine produces a small, positive reaction to the TB skin test.

The size of this reaction wanes with time. BCG vaccination does not protect against new TB infection and does not completely prevent active TB. Workers who have had BCG can benefit from, and should participate in,

the hospital's employee TB skin testing program.

All facilities should have an established TB screening program. L.A.D.D., Inc. employees must have a TB test every three years.

If you think you have an inadvertent, unprotected exposure to TB, report it immediately to management. Since the PPD skin test may not detect infection until 10 to 12 weeks after exposure, wait 3 months before being tested if a recent routine test was negative. If you have not had a recent PPD (within the last 3 months), a baseline PPD should be done to ascertain negative status, followed by PPD in 10 to 12 weeks.

If you have had documented previous positive TB skin test and are undergoing treatment or preventive therapy, you need not have a post-exposure x-ray unless symptoms develop.

If the results of the annual skin test are positive, you should be evaluated to determine if preventive drug treatment is needed.

If you are HIV positive and your work brings you in frequent contact with patients with active TB, discuss this with the hospital's employee health services or infection control practitioner and consider possible re-assignment. Even if the work is considered low-risk, the HIV positive worker should observe all the airborne respiratory precautions.

CONCLUSION

TB is once again a major health concern. Health care professionals who may until now have been somewhat complacent must take all the necessary precautions to protect themselves and their patients from the disease. All workers who have frequent contact with patients with

active or potentially infectious TB or who are involved in high-risk procedures should wear appropriate protective masks or respirators. All workers should have an annual TB skin test. All patients with diagnosed or suspected active TB should be properly isolated.

Those with TB infection without disease should be considered for preventive therapy according to recommendations of the CDC and American Thoracic Society. By following the proper precautions we can protect ourselves and our patients from this old enemy.