Epidemiologic Notes and Reports Transmission of Multidrug-Resistant Tuberculosis from an HIV-Positive Client in a Residential Substance-Abuse Treatment Facility -- Michigan

In November 1989, a man with a history of intravenous (IV)-drug use first presented to the tuberculosis (TB) clinic of the Muskegon County (Michigan) Health Department (MCHD). The patient indicated that he had been treated for pulmonary TB in another city, and he produced for clinic staff his labeled medications, which included isoniazid (INH), rifampin (RIF), and ethambutol (EMB). The patient also stated that he was an IV-drug user (IVDU) and previously had tested positive for human immunodeficiency virus (HIV) infection. Sputum specimens for acid-fast bacilli (AFB) were obtained, and the patient was maintained on his anti-TB medications. His HIV-antibody status was confirmed.

The patient was living in a residential substance-abuse treatment facility in Michigan after moving from a large northeastern city. This treatment facility recruits persons from the northeast who have a history of IV-drug use and offers them a prescribed rehabilitation program of 1 year's duration; however, the facility's attrition rate is high, and no health screening program is in place at the facility.

One week after the initial visit, one of the sputum specimens was reported smear-positive for AFB. A follow-up chest radiograph of the patient revealed a pulmonary infiltrate with a cavitary lesion. Three weeks later, culture of the sputum specimen yielded Mycobacterium tuberculosis resistant to INH, RIF, and EMB. Subsequently, the patient's prior medical records arrived at the TB clinic, confirming his HIV status and his treatment for TB since March 1988; these records also indicated that M. tuberculosis isolated from his sputum previously had been resistant to INH. Because the patient could not be properly isolated in the residential facility, he was transferred to a hospital.

Because of concerns regarding the potential for TB transmission in the residential facility, the MCHD conducted a TB contact investigation in the facility. Its rehabilitation program involves close interaction among clients and staff. Clients are housed in a two-story building that contains several large, crowded dormitories for sleeping. Ventilation is provided by opening windows and doors, rather than through a central system, and heat is provided by steam radiators.

Of the 160 clients and staff who were identified as contacts to the index patient, 146 were tuberculin skin tested with 5 tuberculin units of purified protein derivative (PPD) using the Mantoux technique. Of the 14 persons not tested, 10 had histories of tuberculin skin-test positivity, and four had left the facility. The skin tests were read at 48 hours for 140 of the tested persons (six residents did not return for reading). Of the 140 persons, 16 (11%) had reactions of greater than or equal to 5 mm and were considered skin-test positive.

In March 1990, MCHD personnel returned for follow-up skin testing of 70 persons who were previously...
skin-test negative and were still present in the facility. Of these, 15 (21%) were positive (i.e., skin-test converters), 54 (77%) remained negative, and one (1%) person had left the facility before having his test read. Fourteen of those with documented skin-test conversions were residents of the facility, and one was a staff member.

Chest radiographs were obtained for all persons with a positive skin test, including those positive by history alone. Although no additional cases of clinical TB were identified, the investigation identified a total of 31 skin-test positive persons and a documented skin-test conversion rate of 22% (15/69 tested).

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Editorial Note

Editorial Note: Even before the HIV epidemic, IVDUs were reported to be at high risk for developing TB (1). In IVDUs who are coinfected with HIV and M. tuberculosis, however, the risk of developing clinically active disease is substantially increased and may be as high as 7% per year (2). In several areas, HIV infection among IVDUs accounts for much of the HIV-associated increase in TB (3,4).

In Muskegon County, a patient with multidrug-resistant TB infected at least 15 and possibly as many as 31 persons. However, the number of skin-test converters identified in this investigation may underestimate the true number. Although the HIV-antibody status of residents of the substance-abuse facility was unknown, the clients were at high risk for HIV infection; HIV-related delayed type hypersensitivity (DTH) anergy may have decreased skin-test reactivity to PPD tuberculin (5). In addition, nearly half of the clients who were initially skin-test negative were not available for repeat evaluation.

Federal regulations require tuberculin skin testing of IVDUs before they are admitted to treatment programs (6). Given the substantial risk for TB and the potential for its prevention, substance-abuse programs should perform a skin test and record the diameter of induration on each new enrollee, as well as on persons who are already enrolled but have not been tested. Persons with a tuberculin skin test of greater than or equal to 5 mm induration should be further evaluated for clinical TB and, if disease is present, treated according to current guidelines. If clinical disease is ruled out and exposure to drug-sensitive M. tuberculosis is assumed, known and suspected HIV-infected persons, regardless of age, with a tuberculin reaction of greater than or equal to 5 mm should receive 12 months of INH preventive therapy, unless medically contraindicated; all HIV-seronegative IVDUs with a reaction of greater than or equal to 10 mm should receive 6 months of INH (7). All consenting IVDUs and their sex partners should receive counseling and HIV-antibody testing (8).

Because of apparent PPD anergy among some asymptomatic persons with HIV infection, HIV-infected persons should be evaluated for DTH anergy in conjunction with PPD tuberculin testing. This recommendation is particularly important for persons at increased risk for tuberculous infection (e.g., recent contacts of a person with infectious TB). Companion testing with two DTH skin test antigens is recommended; mumps, Candida, and tetanus toxoid antigens administered by the Mantoux method are preferred. Guidelines for anergy testing in HIV-infected persons are being developed. Anergic HIV-seropositive persons who are known contacts of patients with infectious TB should be considered for preventive therapy once active TB has been ruled out.

The usual approach to managing persons recently infected with M. tuberculosis is to administer INH preventive therapy for 6-12 months (9). In Muskegon County, however, the infected contacts were presumably infected with organisms resistant to INH and RIF. No drug regimens have proven effective in preventing progression to disease in persons infected with multidrug-resistant TB. This outbreak and
others (10) highlight the need for alternative preventive therapy regimens in such instances.

The findings from the investigation in this report underscore the needs to: 1) immediately isolate and treat institutionalized persons suspected of having infectious TB and rapidly initiate a contact investigation when the diagnosis of TB is first considered (e.g., sputum smear is positive for AFB), rather than when it is confirmed by identification of the organisms on culture (11); 2) suspect drug-resistant TB in a patient who remains sputum smear-positive despite therapy for greater than 3 months; and 3) develop rapid diagnostic tests to identify M. tuberculosis and to perform drug-susceptibility studies (12). Finally, medical information about a patient who is under a health department's care and who relocates should be expeditiously communicated to the health department in the patient's new jurisdiction.

References


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