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Outbreak of Multidrug-Resistant Tuberculosis at a Hospital -- New York City, 1991

From January 1991 through July 1992, multidrug-resistant (i.e., resistant to at least isoniazid {INH} and rifampin {RIF}) *Mycobacterium tuberculosis* (MDR-TB) was isolated from 43 (22%) of 198 patients with newly diagnosed TB at a New York City hospital. This report summarizes an epidemiologic investigation by the hospital infection-control, infectious diseases, and employee services staffs and presents information for the 32 patients in whom MDR-TB was diagnosed during January 1991-March 1992 (these were the only patients for whom complete information was available and analyzed).

A case was defined as a TB isolate resistant to at least INH and RIF from a person who had been treated as an inpatient from December 1990 through March 1992. Sixteen (50%) patients were men; mean age was 37 years (range: 22-78 years). Of the 32 patients, 29 (91%) have died; all 29 were seropositive for human immunodeficiency virus (HIV). Of those remaining, one was seronegative, and two refused testing. Thirty-one had been patients on the HIV ward and had been treated for complications of HIV infection. In addition to INH and RIF resistance, isolates from 29 (91%) of the 32 patients were resistant to ethambutol and streptomycin.

Of the 32 inpatients with MDR-TB, 28 (88%) had documented exposure to an infectious MDR-TB patient while in the hospital 30 or more days before being diagnosed with TB. Transmission of MDR-TB was not documented to patients other than those on wards with other MDR-TB patients. Isolates from 18 patients studied with restriction fragment length polymorphism analysis had the same DNA pattern, suggesting transmission of a common strain.

During November 1991, tuberculin skin tests (TSTs) were administered to the 21 health-care workers (HCWs) with negative TSTs in the previous year but who were regularly assigned to the HIV inpatient unit. Of these, TSTs were reactive (i.e., greater than or equal to 5 mm induration) for 12 (57%): seven nurses, four aides, and one clerical worker. Chest roentgenograms performed on all TST-reactive HCWs were negative, and none had become symptomatic as of mid-July 1992. HCWs had not used respiratory protection during the period transmission was documented (January 1991-March 1992).

Hospital charts of all persons with MDR-TB were reviewed to determine patients' HIV status, drug use, and previous history of TB diagnosis and hospitalization. TB was not initially suspected in 16 case-patients, and acid-fast bacillus (AFB) precautions either had not been used or were instituted late during hospitalization. Health-care workers observed that MDR-TB patients (before and/or after diagnosis) frequently left their rooms to visit other patients, meet visitors, or walk to the day room. Doors to the patient rooms in the HIV ward were frequently left open.

An environmental investigation of the ventilation system for the HIV unit revealed that all rooms were at positive pressure with respect to the hall. The exhaust vents were nonfunctional because they were obstructed with dust and dirt.

Control measures implemented since January 1991 have included repairs of the ventilation system and restoration of negative pressure to the isolation rooms, educating clinicians regarding the need to consider TB in all patients with fever and respiratory symptoms, institution of AFB isolation (i.e., placing patients in negative-pressure rooms) for any patient with suspected or confirmed TB, and rapid microbiologic evaluation of HIV-infected patients for TB. In April 1993, the hospital opened one ward that had been modified to serve as a TB unit; all rooms meet the CDC AFB isolation room recommendations (i.e., negative pressure, at least six air exchanges per hour, and air exhausted to the outside away from intake vents, persons, and animals {1}).

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Editorial Note

Editorial Note: Since 1989, eight nosocomial MDR-TB outbreaks have been documented by CDC in the United States (2-4; CDC, unpublished data). The outbreak described in this report involved HIV-infected patients who were not recognized as being infected with TB or were not suspected of having MDR-TB and who had been housed on a dedicated HIV ward; delays in disease recognition consequently delayed initiation of appropriate isolation (i.e., negative-pressure rooms or confinement to rooms).

In this report, HCWs also were at risk for infection. Factors that may have contributed to infection of the HCWs were the inability to properly isolate patients with MDR-TB in negative-pressure rooms, exposure to inadequately masked infectious MDR-TB patients, and/or inadequate respiratory protection of HCWs. Identification of HCWs infected with TB requires active surveillance and TST programs (1).

The findings in this report and investigation of other MDR-TB outbreaks underscore the importance of fully implementing CDC guidelines for preventing TB transmission in health-care settings (1). In one national survey, approximately 27% of U.S. hospitals had no rooms with AFB isolation facilities (5), and capabilities of many laboratories to isolate, identify, and determine antimicrobial susceptibility of *M. tuberculosis* isolates are limited (6).

The morbidity and mortality associated with MDR-TB outbreaks emphasize the need for implementation of guidelines that include 1) education of clinicians to consider TB in any patient with fever and respiratory symptoms, particularly among immunocompromised persons; 2) effective AFB isolation of suspected/confirmed TB patients; 3) early institution of effective treatment regimens; and 4) appropriate follow-up of discharged patients (7). Consideration should be given to treating all patients with directly observed therapy to insure that all antituberculous medications are taken for the full course of therapy (8). In addition, patients exposed to other patients with infectious TB for whom effective AFB isolation was not in place should be identified, evaluated for TB infection and disease, and evaluated for preventive therapy once active TB has been ruled out (1,8).

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