

## Other Drugs Used in Multidrug-Resistant Tuberculosis

Amikacin and kanamycin are aminoglycoside antibiotics with activity against mycobacteria. Although they are not usually considered antitubercular drugs, one may be a component of a 4- to 6- drug regimen to treat suspected or known MDR-TB. Similarly, the fluoroquinolones (eg, levofloxacin, ofloxacin, sparfloxacin) have antimycobacterial activity and may be used to treat MDR-TB.

## TREATMENT OF ACTIVE TUBERCULOSIS

Adequate drug therapy of clients with active disease usually produces improvement within 2 to 3 weeks, with decreased fever and cough, weight gain and improved well-being, and improved chest x-rays. Treatment should generally be continued for at least 6 months, or 3 months after cultures become negative. Most clients have negative sputum cultures within 3 to 6 months. If the client is symptomatic or the culture is positive after 3 months, noncompliance or drug resistance must be considered. Cultures that are positive after 6 months often include drug-resistant organisms, and an alternative drug therapy regimen is needed. With the increasing prevalence of MDR-TB, guidelines for treatment have changed and continue to evolve in the attempt to promote client adherence to treatment and to manage MDR-TB, two of the major problems in drug therapy of tuberculosis.

- The most commonly used regimen consists of INH, rifampin, and pyrazinamide daily for 2 months, followed by INH and rifampin (daily, 2 times weekly, or 3 times weekly) for 4 additional months. If 4% or more of the tuberculosis isolates in the community are INH-resistant organisms, ethambutol or streptomycin should also be given until susceptibility reports become available. If the causative strain of *M. tuberculosis* is susceptible to INH, rifampin, and pyrazinamide, the regimen is continued as with the 3-drug regimen described and the fourth

drug (ethambutol or streptomycin) is discontinued. If rifampin is not used, an 18-month course of therapy is considered the minimum. In the absence of drug resistance, INH and rifampin in a 9-month regimen are effective; adding pyrazinamide for the initial 2 months of therapy allows the regimen to be shortened to 6 months.

- For INH-resistant TB, the recommended regimen is rifampin, pyrazinamide, and ethambutol for 6 months. For rifampin-resistant TB, recommended regimens are INH and ethambutol for 18 months or INH, pyrazinamide, and streptomycin for 9 months. For MDR-TB, a 5- or 6-drug regimen, individualized according to susceptibility reports and containing at least 3 drugs to which the organism is susceptible, should be instituted. Such regimens include primary and secondary antitubercular drugs as well as other drugs with activity against *M. tuberculosis*, such as amikacin, kanamycin, levofloxacin, ofloxacin, or sparfloxacin. Some clinicians include at least one injectable agent. The drugs should be given for 1 to 2 years after cultures become negative, preferably with direct observation. Intermittent administration is not recommended for MDR-TB.
- In the intermittent schedules, health care providers (or other responsible adults) either administer the drugs or observe the client taking them (called DOT). This method was developed for clients unable or unwilling to self-administer the drugs independently. DOT increases adherence to and completion of prescribed courses of treatment. It is considered desirable for all treatment regimens and mandatory for intermittent regimens (eg, 2 or 3 times weekly) and regimens for MDR-TB.
- During pregnancy, a 3-drug regimen of INH, rifampin, and ethambutol is usually used, with close monitoring of liver function tests. Pyrazinamide and streptomycin should not be used during pregnancy.

## MYCOBACTERIUM AVIUM COMPLEX DISEASE

*Mycobacterium avium* and *Mycobacterium intracellulare* are different types of mycobacteria that resemble each other so closely they are usually grouped together as MAC. These atypical mycobacteria are found in water and soil throughout the United States. The organisms are thought to be transmitted by inhalation of droplets of contaminated water; there is no evidence of spread to humans from animals or other humans.

*M. avium* complex rarely causes significant disease in immunocompetent people but causes an opportunistic pulmonary infection in approximately 50% of clients with advanced HIV infection. Symptoms include a productive cough, weight loss, hemoptysis, and fever. As the disease becomes disseminated through the body, chronic lung disease develops and the organism is found in the blood, bone marrow, liver, lymph nodes, and other body tissues.

The main drugs used in prevention of MAC disease are the macrolides, azithromycin and clarithromycin (see Chap. 37),

### Nursing Notes: Ethical/Legal Dilemma

Hong Pham was recently diagnosed with active tuberculosis (TB). His physician is discussing treatment options through a translator. Mr. Pham is against taking medications (isoniazid, rifampin, and ethambutol) that the doctor is prescribing, requesting that he be allowed to cure the TB with herbal remedies.

#### Reflect on:

- Mr. Pham's right to refuse treatment.
- The role culture may play in Mr. Pham's decision.
- The rights of the general public to be protected from infectious disease.
- How to work with Mr. Pham to resolve this conflict.