Can you get tuberculosis twice?

Background and epidemiology: First exposure to tuberculosis (TB) usually results in a clinically silent infection. Often the only sign is a positive reaction to a skin test with purified protein derivative. Most clinically relevant TB is thought to be a postprimary infection caused by the reactivation of a previously dormant primary (endogenous) infection. There have been some reports of exogenous reinfection with multiple-drug–resistant strains of Mycobacterium tuberculosis, but these were restricted to HIV-positive patients who were immunocompromised.1

However, findings from a study conducted in 2 poor suburban communities in Cape Town, South Africa, suggest that reinfection may be more common than previously thought.2 Participants had had an episode of postprimary TB treated and cured between 1992 and 1998 that was followed by a second, new episode of postprimary disease. The study is unique for its careful attention to documenting the first cure and the fact that sputum samples were available for DNA fingerprinting of tuberculosis organisms by means of restriction fragment length polymorphism (RFLP) analysis.

Although the rates of TB infection were high in these communities and many patients had at least 2 episodes of postprimary infection, only 16 patients had their M. tuberculosis organisms genotyped by means of RFLP. For 12 of the 16 patients the banding patterns of the organisms in the 2 episodes were different: they had been reinfected with an exogenous (new) organism. The authors were able to confirm that 15 of the 16 participants did not have HIV antibodies. In this region of South Africa, TB reinfection after an initial infection has been cured appears to be an important cause of postprimary infection and may be responsible for up to 75% of cases of postprimary disease (95% confidence interval 50%–94%).

Clinical management: Currently in North America, elderly people in whom clinical TB develops are assumed to have a reactivated earlier infection. The findings from the South Africa study strongly suggest that at least some of the cases that are identified as being endogenous reactivation may in fact be exogenous reinfection. These results may have implications for TB control in North America. For example, a clinician who has an elderly patient with TB may be less certain that the offending strain was acquired by the patient decades earlier and is, therefore, sensitive to standard drug therapy. If the infection is indeed new, the organism is more likely to be resistant to therapy. Also, it may be prudent to provide chemoprophylaxis for people exposed to a patient with active TB, even if the patient has a history of previous infection.

Nonetheless, the primary management strategy must still be the treatment of clinical infection, regardless of whether it was acquired endogenously or exogenously. Directly observed short-course treatment (DOTS) and the associated strategies for isolating the patient and identifying contacts remain the current mainstay of modern TB control and treatment.3

Control and prevention: The findings from South Africa, especially if confirmed in other populations (a report from the Netherlands4 suggests that exogenous reinfection may be very rare, perhaps related to the probability of exposure5), have implications for public health. First, public health physicians should no longer presume that TB in an elderly person is simply due to reactivation of a previous infection. The possibility that the patient has a newly acquired infection will require a diligent search in the community for the source of the infection. Second, if primary infection does not convey immunity to subsequent infection with an organism of a different genotype, then there are implications for efforts to develop a vaccine against TB. A vaccine against a single genotype may not be effective. To improve their investigation of new cases, public health epidemiologists in North America should consider the need to genotype TB strains in all cases.

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References