Need For Continuing Tuberculosis Surveillance In Previously Screened New Immigrants

Pesach Shvartzman, MD, and Jack Froom, MD

Despite the advent of effective chemotherapy and improvement in socioeconomic conditions, tuberculosis remains a highly prevalent disease in certain countries. There are an estimated 30 million cases in the world, with an annual incidence of 10 million and a mortality of 3 million.[1] Although the new case rate in the United States in 1989 was 9.5:100,000, tuberculosis was nevertheless the leading cause of death among the 38 communicable diseases reported to the Centers for Disease Control.[2] The general trend toward a decline in tuberculosis incidence has slowed recently. This decrease has been attributed in part to the reactivation of tuberculosis in persons immunosuppressed by the human immunodeficiency virus.[3]

In the initial postindependence period, Israel experienced a high case rate of tuberculosis (216:100,000 in 1950), largely resulting from massive immigration from non-Western countries.[4] More recently (1980 – 1985) the risk of infection has gradually declined to an average annual case rate of 6.3:100,000.[5,6] In contrast with the low national incidence, Halperin recently reported a relatively high incidence in an Israeli family practice.[7] During a 3-year period (1984 – 1986) 10 cases of active tuberculosis occurred among recent Ethiopian immigrants who had negative chest radiographs and tuberculosis skin tests when they entered Israel an average of 1.7 years before diagnosis. In an effort to assess the immigration screening program and find an explanation for these cases, we reviewed the results of the primary screening at entrance to the country of all new immigrants to our district during this period.

Submitted, revised, 8 February 1992.

From the Department of Family Medicine, University Center for Health Sciences, Ben-Gurion University of the Negev, Beer Sheva, Israel (PS), and the Department of Family Medicine, Health Sciences Center, State University of New York at Stony Brook (JF). Requests for reprints should be addressed to Pesach Shvartzman, MD, Department of Family Medicine, Ben-Gurion University of the Negev, POB-653, Beer Sheva, Israel 84105.

Methods

The Afula District Office of the Israeli Ministry of Health serves a population of approximately 275,000, of whom 1721 were new immigrants from Ethiopia. The urban family practice clinics serve a population of 11,000 persons including 1200 newly arrived Ethiopians. A description of the patients who had active tuberculosis (diagnosed according to the American Thoracic Society criteria[3]) in an urban family practice has been described.[7]

For this study we reviewed the Afula District Office of the Ministry of Health screening results for all new immigrants to the area from 1984 to 1986. Mantel-Haenszel chi-square and relative risk were computed to assess differences of tuberculosis incidence between the Ethiopian and non-Ethiopian groups in our clinic. These incidences were then compared with that of the general Israeli population.

Results

During the 3-year period of our study, the Afula District Office of the Ministry of Health screened 1721 new Ethiopian immigrants. In this group, 64 had abnormal findings on chest radiographs compatible with active tuberculosis, and 362 had a purified protein derivative (PPD) skin test with induration greater than 10 mm, for a prevalence at entry to the country of 24.1 percent. All of these patients were offered appropriate treatment and were watched closely by special health workers for up to 2 years to assure compliance. All 10 Ethiopian patients reported previously[6] had had a negative chest radiograph and a negative skin test reported in the preentry screening.

Given the average annual Israeli national incidence of 6.3 cases per 100,000 population (1980 – 1985), the expected number of cases during the 3-year study period for the urban clinic was 2; instead, 14 cases were found, with case rates of 369:100,000 for Ethiopians (relative risk 58.4, 95 percent confidence intervals 28.4–119.6) and 13.6:100,000 for non-Ethiopians

(relative risk 2.1, 95 percent confidence intervals 0.8–2.6).

Discussion

Although Ethiopian immigrants to Israel have a high rate of tuberculosis at entry,[6] the high incidence of tuberculosis in a population that was properly screened and initially reported negative was unexpected.

There are several possible explanations for these findings. After admission to Israel, the Ethiopian groups tended to congregate within their settlement community and live closely together. Patients could have been incubating the disease at the time of entry and subsequently spread the disease to their noninfected neighbors. Others could already have been infected but, having poor nutrition, were unable to mount an immunological response sufficient to render a positive skin test.[3] In spite of the close follow-up assured by the Ministry of Health, it is still possible that treatment failures caused by either noncompliance or resistant organisms occurred and that these persons subsequently infected their neighbors. Although unlikely, some misdiagnosis of tuberculosis could have occurred because of incorrect interpretation of the radiographs or the PPD test. Administrative irregularities (many immigrants had more than one family name, and their age and family status were often unclear) could also be possible explanations.

In England and Wales during 1978–79, the overall annual rate of tuberculosis was 18.3:100,000, but in the ethnic groups from the Indian subcontinent, the levels were much higher (382–1132:100,000).[8] Given the figures, the Joint Tuberculosis Committee of the British Thoracic Society has recommended the screening of all immigrants from countries where tuberculosis is common.

In the United States the Advisory Committee for Elimination of Tuberculosis gives top priority to preventing tuberculosis in high-risk groups, especially among foreign-born immigrants.[9] The committee recommends the following tuberculosis preentry screening program for all immigrant visa applicants[9]:

1. A chest radiograph for all applicants 15 years of age and older
2. A tuberculin skin test for applicants younger than 15 years of age who are close contacts
3. A chest radiograph for all Southeast Asian refugee children aged 2 to 14 years

The Israel Ministry of Health has also instituted an even more vigorous screening program for all Ethiopian immigrants. This program includes a history and physical examination, and regardless of age, a chest radiograph and PPD skin test. Treatment is offered if either is positive. Yet, within an average of 1.7 years after immigration, 10 cases of active tuberculosis appeared in the group of 1200 Ethiopians who were initially reported as having negative chest radiographs and skin tests on arrival in Israel.[6]

Our data are not dissimilar to those reported from the United States, where follow-up examinations revealed that of 9544 patients with tuberculosis diagnosed in a preentry screening as class B (tuberculosis not considered active), on follow-up 1.2 percent had active pulmonary tuberculosis and 0.7 percent had extrapulmonary tuberculosis. Most of the cases developed within 5 years after the immigrants entered the country.[9]

It is of interest that none of the three national screening programs (Israel, the United Kingdom, and the United States) emphasize the need for continuing tuberculosis surveillance of previously screened new immigrants. Our data suggest otherwise.

From our work, we conclude that high-risk immigrant populations require continuing tuberculosis surveillance beyond the initial screening process. This program should involve a periodic skin test that would detect asymptomatic cases and prevent progression and the spread of disease to others. In addition, respiratory illnesses (other than those that were previously self-limited) in these patients should alert the clinician to the possibility of tuberculosis.

We would like to thank the Israeli Ministry of Health for their cooperation, the staff of the Herzl Family Practice Centre for their support, Ms. Joni Solin for her technical aid, and Dr. Avrum Mark Clarfield for reviewing the manuscript.

References

1. Comstock GW. Tuberculosis — a bridge to chronic disease epidemiology. Am J Epidemiol 1986; 124: 1-16.

2. Centers for Disease Control Surveillance Summaries. A strategic plan for the elimination of tuberculosis in the United States. MMWR 1989; 38(Suppl S-3).
3. American Thoracic Society. Diagnostic standards and classification of tuberculosis. Am Rev Respir Dis 1990; 142:725-35.
4. Simchen E, Zilber N, Wartski S, Shakya GR. Incidence of tuberculosis among children born in Israel 1956 to 1979. Isr J Med Sci 1984; 20: 695-701.
5. Marcus J, Lewit T, Michaeli D. Discontinuation of BCG vaccination of newborn infants in Israel. Harefuah 1984; 106(4):185-6.
6. Wartski SA. Tuberculosis in Ethiopian immigrants. Isr J Med Sci 1991; 27:288-92.
7. Halperin M, Shvartzman P, Dharan S, Raz R. Tuberculosis in a family practice, 1984-86. Isr J Med Sci 1989; 25:111-3.
8. Control and prevention of tuberculosis: a code of practice. Br Med J 1983; 287:1118-21.
9. Centers for Disease Control. Tuberculosis among foreign born persons entering the United States: recommendation of the Advisory Committee for the Elimination of Tuberculosis. MMWR 1990; 39(No. RR-18):1-21.