

# Caveat Doctor!

## Tuberculosis in physicians

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*Physicians long have been a high-risk group for developing tuberculosis. The progressive decline in the incidence of tuberculosis in the United States over most of the second half of the 20th century led to less tuberculosis and less awareness of tuberculosis among physicians. Recent changes, however, have led to an increase in the incidence of tuberculosis in the U.S. and may lead to more physicians being affected. Two physicians in Hawaii were diagnosed as having active tuberculosis in 1990. Physicians should take steps to prevent its spread and should consider the disease in the differential diagnosis when physicians or their patients are ill.*

The relatively high incidence of tuberculosis (TB) in physicians has been recognized for many years. There was a marked reduction in the incidence of TB in the general population between 1940 and 1984, resulting in physicians being less familiar with its signs and symptoms. However, there has been a recent increase in the incidence of tuberculosis in the U.S.

### Case reports

(Note — some information has been intentionally omitted to preclude identification of the individuals by their colleagues.) The first case, a Hawaii-born man in his 50s, presented to his physician with a one-year history of anorexia, non-productive cough and weakness. He did not seek medical attention until his weakness became severe, and he developed fever, night sweats and impairment of cognitive function. His past history was unremarkable except that he had a positive tuberculin skin test as a medical student. He was not aware of any previous abnormal chest X-ray, although he had not had an X-ray for a prolonged period of time. He never had any medical follow-up for his positive skin test and had never taken isoniazid preventive therapy. There was no history of recent contact with TB. He was hospitalized because of his acute illness.

His chest X-ray showed extensive infiltrates throughout the left lung. Arterial blood gas analysis while breathing room air showed pH 7.51, pCO<sub>2</sub> 27 mm Hg, and pO<sub>2</sub> 79 mm Hg. He

underwent both Computerized Axial Tomography (CAT) scanning of the brain and lumbar puncture (LP) to evaluate his abnormal mentation. Both tests were normal. The initial sputum smear showed 3+ acid-fast bacilli (AFB). Routine culture of the sputum yielded no pathogens. Anti-TB treatment was initiated along with intravenous fluids. He improved markedly and was discharged after 4 days in the hospital. His sputum culture was subsequently positive for *Mycobacterium tuberculosis* (*M. tbc*).

He continued his improvement as an outpatient, symptomatically returning to normal over a period of months. Because of his severe illness and persistently positive sputum smears, he remained away from work for a number of months. His sputum culture did not convert to negative until the 4th month of therapy, in spite of full susceptibility of the isolate of *M. tbc* to the drugs and good compliance with therapy. Treatment was continued for a total of one year.

His chest X-ray shows persistent abnormality of the left lung. Epidemiologic studies did not reveal any evidence of transmission to household or workplace contacts.

The 2nd case, a U.S. mainland-born retired physician in his 80s, had lived in Hawaii for decades. As a medical student, he had had evidence of a pulmonary parenchymal calcification. At an unknown time subsequently, he was noted to have fibrotic densities in the lungs which had not changed over a period of many years. He could not recall when he was first noted to have a positive tuberculin skin test. He had never taken isoniazid preventive therapy. He had had no recent contact with TB.

In the fall of 1989, he developed fever and cough and consulted a physician when he developed hemoptysis. His chest X-ray showed no change. A sputum smear showed no AFB, although culture was subsequently positive for *M. tbc*. By the time the positive culture was reported, the patient had recovered clinically and the accuracy of the culture was doubted. He underwent bronchoscopy with no abnormality being noted. Bronchoscopic washings were negative for AFB on the smear but culture was positive for *M. tbc* as was one additional sputum specimen. He was treated with anti-TB chemotherapy and remains clinically well. His chest X-ray did not change during the course of his illness. His sputum culture converted to negative.

### Discussion

In 1990, there were 196 verified (Centers for Disease Control criteria) cases of TB reported by the State of Hawaii Department of Health. Of these, 165 were foreign-born individuals. Of the 31 born in the United States, 23 were born in

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Hawaii and 8 in other parts of the U.S. Two of these 31 were physicians, accounting for 6.5 percent of all U.S.-born cases of TB in the State. The total incidence rate for the State was 17.9 cases per 100,000. The rate for Hawaii-born individuals was 3.2 per 100,000, virtually the same as for those born in other parts of the U.S. Based on a total of about 2,500 physicians in the State, the rate for physicians was 80 per 100,000, near the 112.8 per 100,000 rate found in Hawaii's "high-risk" immigrant population. The risk for physicians was approximately 24 times the risk for the nonphysician U.S.-born population.

Although the case numbers in Hawaii are small and the rate and risk ratio noted for physicians may not be representative of other time periods, there is abundant evidence that physicians are a high-risk group for developing TB. In the past, most medical students and physicians-in-training were infected with *M. tuberculosis*. The American Hospital Association Council on Professional Practice stated in 1946 that, with regard to medical students: "The incidence of infection and disease rises abruptly at the start of their clinical years (contact with patients)". The Council noted an even higher risk of disease in house officers and junior staff members, with infection rates of 75% to 100%.

Although the decrease in TB in the 1940s through 1984 along with the introduction of effective chemotherapy, resulted in less risk to physicians, recent changes in TB epidemiology are likely to result in increased physician exposure to TB. Patients with TB are treated in general rather than special treatment facilities. Most physicians see few if any cases of TB and often do not suspect the diagnosis. Craven et al<sup>2</sup> found a 6-fold increase in the tuberculin skin test conversion rate among hospital personnel and students exposed to patients with clinically unsuspected TB as compared to those without such exposure. Failure of the physician to perform tuberculin skin testing and misinterpretation of chest X-rays were common factors leading to a delay in diagnosis and prolongation of the period of exposure in health-care providers.

TB has long been recognized as a disease of the elderly and this remains true today. The number of elderly in the population is increasing, resulting in more at-risk individuals. Clinical presentation may be atypical in this age group<sup>3</sup>, increasing the risk of transmission to health care personnel.

Finally, physicians who were previously infected with *M. tuberculosis* are at particular risk of developing TB as they become elderly.

Newer methods of diagnosis and treatment of other diseases have increased the potential for physicians becoming infected. Patients on ventilators have been reported as being capable of transmitting nosocomial TB to their care givers<sup>4</sup>, as have *M. tuberculosis*-infected AIDS patients receiving aerosolized pentamidine<sup>5</sup>. The Human Immunodeficiency Virus (HIV) epidemic has contributed greatly to the post-1984 increase in the incidence of TB in the United States<sup>6</sup> and has had some impact in Hawaii<sup>7</sup>. The increased incidence of TB, an atypical presentation in some patients with AIDS, and measures such as aerosolized pentamidine therapy may all contribute to increased risk among physicians. In addition, physicians themselves who may have been infected with HIV have a greatly increased likelihood of developing TB<sup>8</sup>.

The 2 physicians described in this report demonstrate some

of the problems associated with the failure to diagnose TB in a timely manner. The first case had a severe systemic illness that included impairment of cognition. The latter could have affected his medical practice as well as every other aspect of his life. Fatality rates of 25% to 66% over a period of 18 months to 5 years have been reported in those with untreated, smear-positive TB<sup>9</sup>. He underwent the expense and associated risk of hospitalization, CAT scan and LP. He was unable to work for several months. There was a risk of transmission of disease to others, although this did not occur. The 2nd case underwent bronchoscopy, an invasive and expensive procedure. Both physicians required multi-drug chemotherapy, increasing the risk of adverse effects in comparison with single drug preventive therapy.

Isoniazid has been shown since the early 1960s to be effective in preventing the progressive course of TB disease in those infected<sup>10</sup>. The protection is probably lifelong<sup>11</sup>. Physicians should be aware of the indications for isoniazid preventive therapy, for their patients and for themselves<sup>12</sup>.

### Recommendations

To reduce their risk of developing active TB, physicians should take the following steps.

#### A. Reduce the risk of acquiring new TB infection.

1. Consider the possibility of TB in the differential diagnosis of your patient or yourself.
2. Be familiar with local TB epidemiology.
3. Know the tuberculin skin test status of the patient.
4. Order a chest X-ray on high-risk patients with new pulmonary symptoms, who fail to respond to treatment for pneumonia, and have a risk factor for TB.
5. Order a sputum examination for AFB in suspicious cases.
6. Isolate the patient until the diagnosis has been ruled out.

#### B. In physicians who already have TB infection.

1. Be aware of the indications for prophylactic therapy.
2. Physicians with negative skin tests should have periodic skin tests done.
3. Physicians with positive skin tests who have not taken anti-TB chemotherapy should have frequent chest X-rays at the very least.
4. When taking isoniazid preventive therapy, take it regularly and for a sufficient period of time.

### Conclusions

TB has long been a disease that is far more likely to affect physicians than the population-at-large. Though the incidence of TB in physicians has decreased as it has decreased in the general population, TB still remains a problem for all health-care providers. Even if the rate of new TB infections among physicians decreases, there remains a pool of physicians already infected with *M. tuberculosis* who remain at risk of developing active TB. Recent changes have resulted in an increase in the number of cases of TB in Hawaii and in the rest of the United States. This increase will result in increased contact of physicians with individuals who have communicable TB. There are effective control measures available which reduce the risk of infection. There is also effective therapy available for those

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who are already infected. Physicians should be aware of the many ways in which TB presents a particular threat to them. Hawaii law requires periodic evaluation for TB of health-care providers employed by various institutions such as hospitals and care homes. Although most physicians are not covered by these statutes, physicians should be aware of the recommendations for periodic screening and should assure themselves that they too be screened periodically.

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