OCCUPATIONAL DISEASES

A Guide

To Their Recognition

Rewritten and Enlarged Edition of

Occupation Hazards and Diagnostic Signs

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W. M. GAFAFER, D. Sc., Editor

Division of Occupational Health

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Prolonged inhalation of asbestos fibers between 20 and 50 microns long may result in the production of a typical pulmonary fibrosis which may be accompanied by severe respiratory disability. On the basis of experimental studies of asbestosis, it was reported in 1951 that this fibrosis is due to the mechanical action of the asbestos fiber. The fibers, upon being deposited in the terminal bronchioles, initiate a tissue response which results in the coating of the fiber with the ultimate production of what is known as the asbestos or asbestosis body. This response appears to be a defense mechanism of the lung. If large quantities of the fibers are inhaled over a prolonged period of time, characteristically 10 to 20 years, the tissue reaction progresses until a generalized, diffuse fibrosis becomes evident. This fibrosis is seen first in the lower lobes of the lungs but eventually, if exposure continues, appears in the other lobes as well. Respiratory insufficiency and cardiac failure may supervene. It is of considerable interest and significance that asbestos fibers smaller than about 20 microns in length are thought to be incapable of initiating a fibrogenic response.

The roentgenogram of the chest with pulmonary fibrosis resulting from prolonged inhalation of asbestos fibers discloses a typical pattern. In the early or first stages of the disease, the shadows are fine, diffuse and homogeneous and appear characteristically at the base of both lungs. The typical nodular pattern of silicosis is not seen in asbestosis; rather, the affected lung fields present a ground glass appearance.

In moderately advanced or second-stage asbestosis, the infiltration is more in evidence but remains generally confined to the lower lobes. The heart borders may become indistinct or shaggy, a condition which has been referred to as porcupine heart.

In far advanced or third-stage asbestosis, the infiltrate can be seen throughout the middle and upper lung fields; however, the apices generally remain clear. There is almost complete obliteration of the cardiac outline, the domes of the diaphragm and the costophrenic sulci.

It should be emphasized that the chest roentgenogram cannot accurately be used to estimate the presence or extent of impaired pulmonary function or disability in lung diseases in general, and in asbestosis in particular, since many individuals with radiographic evidence of third-stage asbestosis have been able to carry on their usual work and live fairly comfortable lives for several years. On the other hand, definite disability due to asbestosis has rarely been reported in the absence of a typical radiographic pattern.

There is no typical clinical picture for asbestosis. The disease is insidious in its onset and is slowly progressive so long as inhalation of the fiber continues. There is a gradual increase in cough and expectoration, anorexia, and weight loss, all combined with slowly increasing dyspnea. Cyanosis and clubbing of the fingers are rare findings. When an acute pneumonitis

develops in the presence of established asbestosis with fibrosis, recovery is often delayed because healing is slow and relapses are frequent.

The primary functional abnormality in pulmonary asbestosis is one of impaired oxygen transfer across the alveolar membrane rather than impairment of ventilatory capacity. This condition is referred to as an alveolar-capillary block.

Conflicting opinions and differences in reports make it difficult to confirm or deny conclusively a causal relationship between asbestosis and cancer of the lung or extrapulmonary tissues. However, there is increasing evidence to suggest that such a relationship exists.

With regard to the relationship between asbestosis and tuberculosis, it is fairly well established that asbestosis does not predispose to the development of tuberculosis, nor does it aggravate an apparently healed lesion.

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(4) Diatomite Pneumoconiosis

Diatomite, frequently designated diatomaceous earth, diatomaceous silica, or kieselguhr, is composed of the siliceous skeltons of microscopic, unicellular, aquatic plants known as diatoms. Because of its remarkable properties, this nonmetallic mineral has found many industrial uses, such as in filters, insulators, absorbents, and polishes.

Crude diatomite is essentially amorphous silica and contains less than 5 percent of quartz and only traces of cristobalite and tridymite; however, after being processed by high-temperature calcining, the cristobalite content