GOHC - Feb. 1983.



MEDICAL SURVEILLANCE OF PERSONS EXPOSED TO ASBESTOS. - Dr. [illegible] C LEWINSON.

INTRODUCTION.

It is not my intention to talk to you about the physical and chemical properties of asbestos and the various theories as to how it produces the "asbestos-related diseases".

I should like to discuss with you briefly the diseases associated with asbestos exposure and their natural history, the medical examination requirements in the present OSHA Standard, the defects in those requirements and my suggestions with regard to the essential components of medical surveillance of asbestos exposed persons.

In order for the physician to intervene at the interface between the worker and the work and thus to prevent the development of seriously disabling occupational illnesses, a complete data base needs to be established including medical, industrial hygiene and personnel information capable of assesment and application by the health team for the benefit of all concerned.

THE DISEASES.

The first transparency indicates what the pathological effects of exposure are in man. The ranking order of these five situations is intentional and tends to indicate the diseases associated with the LEAST exposure through the WORST exposure. It is, however, easier to discuss the pathological effects in the reverse order.

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WHAT ARE THE PATHOLOGICAL EFFECTS OF EXPOSURE IN MAN?

Exposure to asbestos at work or elsewhere may result in five conditions:

1. The presence of asbestos in tissues without disease - e.g., asbestos bodies in the general population.

2. The presence of asbestos in the tissues causing benign changes - e.g., skin warts, pleural plaques.

3. The presence of asbestos in the tissues and the development of malignant mesothelioma of the pleura or peritoneum.

4. Asbestos in the lungs with tissue damage and the development of lung cancer.

5. Asbestos present with potentially fatal damage to the lungs (pulmonary fibrosis or asbestosis), but no cancer.

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The second transparency lists two other conditions which have been associated with exposure to asbestos. These two conditions have been listed separately, because at the present time, there is insufficient published information regarding the presence or absence of asbestos in human tissue in these cases and the association has been established purely on epidemiological grounds.

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There are two other conditions which have been detected in greater numbers among asbestos workers than would be expected from a similar sample of the general population:

a. Cancer of the gastro-intestinal system involving oesophagus, stomach and colon and rectum.

b. Cancer of the larynx.

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WHAT IS THE EVIDENCE FOR STATING THAT ASBESTOS MAY BE PRESENT IN TISSUE WITHOUT DISEASE?

Examination of material from random autopsy series in several cities has revealed the presence of asbestos in lung tissue. The frequency of this finding depends upon the diligence of the search. When digested lung tissue is examined, prevalence approaches 100%. These findings can occur in the absence of any asbestos associated diseases.

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WHAT ARE THE BENIGN CHANGES IN TISSUES FOUND IN THE PRESENCE OF ASBESTOS AND WHAT ARE THEIR SIGNIFICANCE IN TERMS OF PROGNOSIS?

Warts on the fingers and hand, and a discrete reaction involving the parietal pleura, usually in more than one place and referred to as pleural plaques, are often found in people who have been occupationally exposed to asbestos. Pleural plaques are usually a radiographic diagnosis in an otherwise healthy person. Pleural plaques may calcify. Pleural plaques have also been described in people exposed by living in the vicinity of certain mines or tilling soil with a high asbestos fiber content.

The above conditions are not in themselves disabling, although the pleural plaques may indicate a level of exposure sufficient to progress to more serious disease. The effect of pleural plaques on pulmonary function, although detectable in population studies, is modest and is mainly seen as small reductions in lung volumes. By contrast, X-ray changes may be very striking, particularly in the presence of calcification.

Although the presence of pleural plaques alone does not appear to cause symptoms of disability, there is some evidence that they affect prognosis. They have been associated by some authorities with increased incidence of lung cancer and malignant mesothelioma has been reported as developing in the cells at the edge of the plaque.

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WHAT ARE THE CURRENT VIEWS REGARDING MALIGNANT MESOTHELIOMA?

1. Epidemiologic evidence indicates a gradation of effect related to fiber type. Crocidolite, particularly fiber from the North West Cape Province of South Africa and from Western Australia, is considered to be the type of fiber most frequently associated with mesothelioma. Chrysotile is considered to be least likely to cause it and amosite has been allocated an intermediate status. Although anthophyllite has been associated with asbestosis, pleural plaques and lung cancer, no cases of mesothelioma have been attributed to it.

2. Cigarette smoking does not seem to be a causative factor.

3. Exposure may be of brief duration and there is a long lapsed period (latent interval) between first exposure and diagnosis or death. This lapsed period may be from 20 to 40 years or more - disease diagnosed today had its causation in working conditions between 20 to 40 years ago or longer.

4. The tumor affects the pleura, grows slowly, doesn't spread readily and kills by slowly compressing first the lung on one side and then the vital structures in the center of the chest or the lung on the other side. Peritoneal tumor is less common and is similar in its effects.

5. The tumor can occur from about the age of 35 onwards, but more than 50% do not develop until over the age of 60.

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6. Domestic or neighborhood exposure has resulted in the development of this disease.

7. Mesothelioma is not uniquely associated with asbestos exposure and in most reported series a small proportion (15%-30%) cannot be related to asbestos.

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WHAT ARE THE FEATURES OF ASBESTOS-ASSOCIATED MALIGNANT DISEASE OF THE LUNGS?

1. The risk of premature death from malignant chest disease seems to be confined to those with high dust exposure, though sometimes of brief duration.

2. Asbestosis is no longer an inevitably fatal condition because improved dust conditions have resulted in a "milder" form of disease, or in fact a sub-clinical entity which is not always recognized. Less mortality from asbestosis occurring after longer periods of exposure to lower concentrations of dust than in past years has resulted in survival of workers through the long latent period of lung cancer.

3. The interaction of cigarettes and asbestos exposure as risk factors is of great importance. Non-smoking asbestos workers rarely get lung cancer.

4. The primary lung cancers in smoking asbestos workers do not differ in their effects from primary lung cancers in other people, and the results of treatment do not differ either.

5. Although lung cancer is usually associated with asbestosis, some authorities believe that this is not necessarily so.

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J. DOES ASBESTOS HAVE OTHER CARCINOGENIC PROPERTIES?

1. Cancer of the gastro-intestinal tract involving oesophagus, stomach, colon and rectum, has been reported in excess in asbestos insulation workers and other asbestos workers.

2. An association has been found in some reported studies between an excess incidence of cancer of the larynx and asbestos exposure.

3. At present there is insufficient published information regarding the presence or absence of asbestos in human tissue in these conditions and the association has been established purely on epidemiologic grounds.

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WHAT IS ASBESTOSIS AND HOW DOES IT AFFECT THE EXPOSED INDIVIDUAL?

1. Asbestosis is a fibrosis or scarring of the lungs and includes the associated thickening of the visceral pleura, but not that of the parietal pleura.

2. The lower (dependent) parts of the lungs are affected first progressing as the years go by even after exposure ceases.

3. A diagnosis of asbestosis can only be made by examining the worker, all the available x-ray films, the pulmonary function test made over a period of time and the complete occupational history.

4. Other respiratory diseases such as chronic bronchitis, emphysema, asthma and certain chronic lung diseases can be mistaken for asbestosis.

5. From the time symptoms are first noted, most workers can continue with light work for 10 to 15 years and may live another 5 to 10 years after finishing such work.

6. Asbestosis is unusual under the age of 50. Other conditions leading to the necessity for light work and retirement may precede it in this age group.

7. Improving industrial conditions over the past 20 years have resulted in a type of asbestosis less severe than in the 1930's, 1940's and 1950's. At the present time life expectancy may not be appreciably shortened by this disease.

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WHAT ARE THE CLINICAL TESTS WHICH CAN BE USED IN THE DIAGNOSIS OF ASBESTOSIS IN LIGHT OF THE BACKGROUND INFORMATION IN THE PREVIOUS SECTIONS?

Asbestosis may be diagnosed using the following criteria:

a. Obtaining a history of "adequate" exposure,

b. Eliciting fine end-inspiratory crackles at the lung bases on auscultation,

c. Finger clubbing (may or may not be present),

d. X-ray changes - small irregular and/or rounded opacities (ILO U/C Classification),

e. Pulmonary function changes indicative of restriction of ventilation or impairment of gas exchange. (Airways obstruction is not usually a feature of asbestosis, but has been reported in some studies.)

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