04-57

AC 2/28 11:15

PLEURAL DISEASE IN 845 ASBESTOS WORKERS

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PLAINTIFF'S EXHIBIT

USX-1160

The pleura reacts to injury from asbestos in several ways. These reactions include effusion, fibrosis, plaques, calcification, and the development of malignant mesothelioma. We undertook this study to determine the prevalence of pleural disease and physiologic effects of asbestos pleural involvement, and to measure interreader variability of radiographic classification. A panel of pulmonary clinicians coded the chest roentgenograms of 845 asbestos workers according to a modified ILO/UC classification for the pneumoconioses. Coding of pleural abnormalities included unilateral or bilateral blunted angles, 2 grades of thickness, plaques and calcification. Workers included pipecoverers from 2 different shipyards, shipfitters with minimal exposure, all employees of an asbestos product manufacturing plant and all employees of two paper mills: some in the first mill with 5 years of intensive exposure in the early 1950's and workers in the second mill were not exposed to asbestos until 1968.

Pleural abnormalities were most common in the heavily exposed workers, but in contrast to parenchymal disease they occurred after minimal exposure (Table I). By comparing the group of shipfitters and pipecoverers, the presence of pleural disease is an indicator that asbestos exposure has occurred or a marker of exposure while parenchymal disease is related to the level of exposure.

The occurrence of pleural disease was categorized according to the number of years since first exposure. These data show that effusion is the first abnormality to appear, usually within a few years of exposure, blunted angles and thickening can be seen after 10 years, plaques and parenchymal disease after 20 years and finally

calcification 30 years after initial exposure. The presence of blunted angles is the least specific of all pleural abnormalities since the percentage of workers with known exposure who have this finding is less than for workers with the other pleural abnormalities. Plaques and calcification were often seen in employees who have jobs that are not directly involved with asbestos, e.g., administrative personnel.

In general, physiologic studies indicated a lower forced vital capacity (FVC) and single breath diffusing capacity (Dsb) in workers with both pleural and parenchymal disease than in workers with an equivalent degree of parenchymal abnormality alone. The one exception occurred in workers with an overall profusion of 0/0 to 0/1 (normal films). In these, the FVC was lower in workers with pleural involvement, but the Dsb was not and was the same for workers with or without pleural disease.

Finally, the radiographs of 122 shipyard workers were classified by a chest radiologist and a pulmonary clinician. Comparison of readings indicated no differences in the coding of parenchymal linear (stu) opacities, blunted angles and calcification, but a lack of agreement in the reading of plaques and pleural thickness.

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TABLE I

PERCENTAGE OF PLEURAL ABNORMALITIES IN 845 ASBESTOS WORKERS

cupation or Plant	Number Seen	Exposure Level	Parenchyma: ≥ 2/1	Blunted Angles	Thickness	Plaques	Calcification	Effusion*	Total Pleura
overers #1	79	High	22	20	19	6	15	6	34
itters	74	Nil	7	17	11	8	8	3	23
overers #2	178	High**	4	8	10	7	3	5	16
oducts	139	High	12	9	14	11	9	6	22
ll A	202	Mixed	5	9	12	5	0	2	17
ll B	173	Recent	0	5	5	1	0	0	8

*Asbestos effusion confirmed by thoracentesis or serial chest films, no evidence of disease associated with effusion and no tumor within 3 years.

*High exposure level but includes many newly hired employees.