

of tissue examined (99), or if lung juice is examined, the vigor with which it is extracted. When digested lung tissue is examined, prevalence approaches 100 per cent (113, 114). It is not likely that these figures have been much influenced by the presence of overt asbestos-related lung disease, which was usually specifically excluded from the autopsy series examined (16) or was found to be minimal, perhaps a small single area of basal fibrosis (98, 99).

Despite the fact that ferruginous bodies may not contain an asbestos core, it is probable that most of those found in the lungs of many city dwellers do (Planteydt, 7, p. 80). Thus, prevalence of ferruginous bodies may reasonably be regarded as a reflection of community exposure. In keeping with this is the rural-urban gradient, evident in table 5, which lists the data by increasing prevalence. Thus, rural areas and small cities fall at the beginning of the table; large industrialized urban centers, at the end. A similar rural-urban gradient was seen in another series in which counting methods were standardized (Oldham, 7, p. 231). Prevalence was also consistently higher among men than women. In addition, it increased with age (16, 111), and when within-city distribution was examined, as in the study of London, England, higher prevalences were found among those who lived closest to the docks and/or the industrial heart of east London, among those engaged in heavy manual work, and among those whose occupations were in shipping, transport, and engineering (16). In addition, there is the interesting observation that prevalence increased with time (1936 to 1966) in London, England, but not in New York (see table 5).

Ferruginous bodies have been found on rare occasions in the hilar nodes in persons believed to have been heavily exposed (120), and more rarely, beyond the limits of the thoracic cavity, e.g., in spleen, sinuses; tonsils (54), and hyaline liver plaques (59). Further, in autopsy material obtained from cases with asbestos-related lung disease, fiber count appeared to be some reflection of dose (54, 59, 120).

As already mentioned, the ratio of coated to uncoated fibers within the lung appears to be fairly constant at 10 to 30 per cent (49, 59). Thus, although a count of coated fibers underrepresents the total fiber content of the lung, it should, nevertheless, reflect reasonably accurately trends with respect to age, sex, residence, and occupation.

From the clinician's point of view, this information, based on epidemiologic studies, carries the clear message that the presence of asbestos fibers, coated or uncoated, in biopsy material, autopsy material, or, for that matter, sputum (117-119), which after all, only reflects the lungs' effluent, is an indication of past or current exposure to asbestos (provided the fiber is positively identified). If the fiber is not positively identified, exposure to asbestos remains the likely, but not the only, explanation. Given a history of occupational exposure to asbestos, the physician is unlikely to require positive fiber identification for any clinical purposes. In the absence of history of asbestos exposure, such identification might be useful, but of more importance would be an exhaustive review of all of the patient's previous occupations for however brief a period of time, as well as investigation of the possibility of nonoccupational exposure.

Pleural Plaques, Hyaline or Calcified (Fibrotic Thickening of the Parietal Pleura)

Two types of pleural reaction are seen in association with asbestos exposure: (1) an exudative reaction, usually widespread, involving both parietal and visceral pleura and usually, the lung parenchyma, with obliteration of the pleural space; and (2) a discrete reaction, involving the parietal pleura, usually in more than one location, and referred to as a pleural plaque (120). The first is associated with symptoms and affects function (121) and will be considered later in this review together with pulmonary fibrosis. The second, usually a radiographic diagnosis in an otherwise healthy person, will be considered in the present section. Both reactions may, of course, occur together in the same person; however, the clinical presentation is likely to be dominated by the extent of the exudative reaction.

Pathology

Macroscopic appearances. Pleural plaques occur as discrete, raised, grey-white lesions on the inner surface of the rib cage and on the diaphragm. In a series of patients who had pleural plaques described at thoracoscopy, Mattson and Ringqvist (121) commented that "despite the confusion of different sizes and shapes, sometimes suggesting an archipelago, the pattern of the plaques is nevertheless monotonous: a flat or slightly uneven surface, white and shiny like synovia or mother-of-pearl, steep edges rising

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