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INDUSTRIAL DUSTS

Asbestos or Ferruginous Bodies. E. A. Gaensler and W. W. Addington.
New Engl. J. Med. 280. 488-492 (Feb. 27, 1969).

Diatomaceous earth, graphite and carborundum have been identified as the core of typical "asbestos bodies" in man. Substances believed to be biologically inert, including fibrous aluminum silicate, fibrous glass, silicon carbide and forsterite have caused ferruginous bodies in hamsters and guinea pigs. Even fragments of the lung's own elastic tissue may produce "elastosis bodies" that look similar. Technics are now available for analysis of the core fibers. They include electron beam and x-ray diffraction, laser microprobes, ultrasonic disintegration and mass spectroscopy. The electron-beam diffraction patterns of ferruginous bodies from 22 lungs of "unexposed" persons did not coincide with that of chrysotile. Since 95 per cent of asbestos used in the United States is of this type, it was concluded that the vast majority of ferruginous bodies found at random autopsies are not from asbestos. Obviously, the diagnosis of asbestosis, based on the finding of ferruginous bodies in an apparently unexposed person, must be made with caution. However, one must be equally cautious in making a diagnosis of "nonspecific interstitial pneumonitis" in a person with known exposure because there is no relation between the number of bodies and the severity of asbestos pneumoconiosis. On the contrary, we and others have noted an inverse relation. In persons with prolonged but distant exposure, often retired because of respiratory impairment, the lungs frequently show severe fibrosis with only rare asbestos bodies whereas in patients with more recent exposure, lung biopsy reveals alveoli filled with bodies and debris-laden macrophages but little or no fibrosis. This paradox can be explained in a number of ways. The small number of asbestos bodies in workers with fibrosis who were exposed long ago may be the result of clearing of the intra-alveolar material. This clearing occurs most rapidly in areas of supple alveolar walls whereas it is delayed in the more noncompliant regions near the thickened pleura and around larger vessels and bronchi. Therefore, the distribution of asbestos bodies is uneven, and their number in any section need not be representative. The relation between the number of visible asbestos bodies and the degree of fibrosis is also poor because only a very small and variable fraction of fibers become coated. Probably the tiniest, uncoated particles, which are invisible by light microscopy, are most fibrogenic because they have the largest aggregate surface area. This is important because at some stage a chemical reaction must initiate the process of fibrosis. The visible asbestos bodies, therefore, are best considered as markers, rather than as important causative agents. In 1929 W. E. Cooke[1] said that "curious bodies have been found in every necropsy in pulmonary asbestosis, and the problems we have to decide are, first, what the bodies are, and second, whether they are diagnostic of asbestosis." Although at first answers seemed deceptively simple, new information increasingly has raised new questions. That asbestos bodies may contain asbestos is clear. It is equally clear that structures apparently indistinguishable from asbestos bodies may have as their core other materials. Unfortunately, the methods of identification are exceedingly complex, and, even in the best hands, results remain tentative. Nevertheless, recent animal exposure and analytical work suggests that, until asbestos has been identified as the core of an "asbestos body," it is best to use the more general term "ferruginous body." There are 27 references. --Cond. from text

1. Fibrosis of lungs due to inhalation of asbestos dust. Brit. M. J. 2:147, 1924

The Community Hazards of Asbestos. J. Cuthbert.
Münch. med. Wochschr. 109, 1369-1372 (April-June, 1967). German.

The inhalation of asbestos is far more dangerous than is generally recognized by the public, since even a transient period of exposure can lead to disease (interstitial fibrosis of the lung, lung cancer, mesothelioma, endothelioma of the pleura and the peritoneum, painful dermal callosities and death many years later. Electron microscopic studies have shown that for every asbestos fiber recognizable under an ordinary (light) microscope, there are hundreds of tiny unrecognized particles, which dust experiments with guinea pigs have shown to be just as dangerous as the larger fibers. While the asbestos industry has taken energetic measures toward the prevention of classical forms of asbestosis by dust elimination in its plants (vacuum removal of dust, use of gas masks, automation of manufacturing processes), such prophylactic measures have not prevented the gradual long-term development of cancer in persons who come into occasional, slight, or temporary contact with asbestos. This group certainly includes members of asbestos workers and all persons living within 1.5 km of an asbestos plant; these persons

tend to succumb to mesothelioma after many years of such contact. A number of examples are given, including those of carpenters and construction workers, who do not realize that their relatively brief contact in sawing or handling asbestos materials can lead to lung cancer many years later. The great increase in asbestos production and in asbestosis in recent years is tabulated; the need for utilization of alternate materials in industry, and for further research on biological effects is emphasized. The presence in asbestos of carcinogenic oils and other components, including benzopyrene and chromium, is mentioned. --APCA Absts.

283 Asbestos Exposure and Pleural Mesotheliomas. R. H. Mortimer and C. B. Campbell. Med. J. Australia 2, 720-722 (Oct. 26, 1968).

Diffuse pleural mesothelioma is reported in two patients exposed to asbestos dust. The neoplasmas were dissimilar in macroscopic and histological appearances. Criteria for classification as mesotheliomas are presented. Asbestos bodies were found in the lungs of both patients, but minimal interstitial fibrosis was present.

--J. Am. Med. Assn. References & Reviews

284 Prevalence of Asbestos Bodies in Basal Lung Smears. A. Polliack and M. I. Sacks. Israel J. Med. Sci. (Jerusalem) 4, 223-226 (March-April, 1968).

Asbestos bodies were found in basal lung smears in 26 of 100 consecutive adult autopsies in Jerusalem. They were present in 29.1% of males and 22.2% of females, and were more frequently encountered in Ashkenazi than in non-Ashkenazi Jews. Asbestos bodies, when present, were usually scanty (less than 10), and in only two males were more than 30 bodies found under low power. The five subjects with more than ten asbestos bodies each were all Ashkenazi Jews. The prevalence of asbestos bodies is compared with Cape Town, Pittsburgh, Miami, Montreal, Glasgow, and Jerusalem. Highest frequency found is in Montreal (48%) and may reflect differences in the degree of atmospheric pollution. --APCA Absts.

285 Pathological Symptoms Due to Inhalation of Asbestos Dust. H. Bohlig. Zentr. Arbeitsmed. u. Arbeitsschutz. 16. 353-355 (Dec., 1966).

In brief literature review, in which authors are mentioned but no references cited, the problem of asbestos dust as a carcinogenic substance is surveyed. Despite greatly increased preventive measures taken in many asbestos plants, and the resultant reductions in cases of asbestosis, problems of asbestos inhalation have acquired new significance during the past five years. The retrospective examination of mesothelioma autopsy material in various countries has implicated asbestos dust as a malignant-tumor inducing agent, not only in asbestos workers but even in others. The well-known "pleura-plaques" of asbestosis and diffuse mesotheliomas have been observed in individuals who had never had occupational contact with asbestos but who had resided in the vicinity of asbestos plants or mines. It can be stated with assurance that pollution of the ambient air (emission) by asbestos factories—which were relatively late in utilizing the asbestos dust of their dedusting installations instead of simply releasing it to the atmosphere—has been a causative factor in a significant increase in the rate of appearance of both pleural plaques and mesotheliomas. Whether or not the quantities of asbestos dust released into the atmosphere from brake linings of automobiles are also responsible for these malignancies is a question which has yet to be determined: however, asbestos was detected histologically in the lungs of city dwellers not exposed occupationally in the following percentages: Pittsburgh, 41.0%; Miami, 27.9%; Cape Town, 26.4%. Individuals endangered by asbestos, in addition to those just cited, include persons who have occasional contact with asbestos in construction or other activities (such as roofers, insulation specialists). The properties of asbestos ores, including their benzopyrene content, are briefly mentioned. --APCA Absts.

286 Asbestos Bodies in the Lungs and Mesothelioma. A Retrospective Examination of a Ten-Year Autopsy Material. I. Hagerstrand, L. Mearman, and B. Odlund. Acta Pathol. Microbiol. Scand. (Copenhagen) 72. (2). 177-191 (1968).

In 12,763 autopsies performed during 1957-66 at the General Hospital, Malmo, Sweden, 33 cases of mesothelioma were found (27 of the pleura, 5 of the peritoneum) for a frequency of 0.27% (0.3% if children under 15 years of age are excluded). Of these, 34 were re-examined