

40. COMPARATIVE EPIDEMIOLOGY OF MEN EXPOSED TO ASBESTOS AND MAN-MADE MINERAL FIBERS

Goldsmith JR

Epidemiology and Health Services Unit, Faculty of Health Sciences, Ben Gurion University of the Negev, Beer Sheva, Israel.

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Comparative analyses are presented of selected studies of long-term reactions to occupational exposures to asbestos and man-made mineral fibers (MMMF), with emphasis on studies with dose-response information and long enough period of follow-up to observe lung cancer excess, if it occurred. Uniform dose estimates based on average number of fibers per milliliter were derived and tabulated with the corresponding standard mortality (or morbidity) ratio (SMR), crude probability for each unfavorable outcome, and the likelihood that at least as many deaths would have occurred as a result of the expected numbers under Poisson assumptions. A dose-response relationship was said to have been indicated when the crude probability increased monotonically with dose and/or the Poisson probability decreased and reached a value of less than 0.05. Some arbitrary assumptions had to be made in estimation of the dose, and they may need to be corrected. Gravimetric dose estimates may have given different results. Studies selected for analysis included Quebec asbestos miners and asbestos cement workers exposed to asbestos, and pooled U.S. and European studies of MMMF workers, as well as a sample of cigarette-smoking fiberglass workers whose X-ray films were evaluated for fine nodular or irregular opacities. The lowest dose capable of showing either a statistically significant excess (single point criterion-SP) or the median dose in an apparent dose-response relationship with cause of death or radiological results is tabulated. Radiological changes show a dose-response relationship for all types, with a median dose for asbestos of 2.8 fibers/ml. For fiberglass workers, the median dose of electron-microscopically detected fibers was two orders of magnitude less. For asbestos SP, exposures of 1.4 to 22 fibers/ml were associated with increased lung cancer, while for mineral wool, the minimal level with significant SP increase in lung cancer was an order of magnitude less. Based on fiber or particle counts, man-made mineral fibers appear to be more potent than asbestos with regard to chronic pulmonary disease.

41. MEDICAL SCREENING OF FORMER ASBESTOS CEMENT WORKERS IN ISRAEL: A PILOT PROGRAM

Tuch H, Tulchinsky TH, Casper M, Knaane H

University of North Carolina, Chapel Hill, School of Medicine.

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A pilot screening program for the evaluation of former asbestos-cement workers was carried out in the Chest Disease Clinic of the Acco Public Health Office (Ministry of Health), Israel. A total of 184 subjects were evaluated using medical and occupational questionnaires, clinical examinations, and pulmonary function tests (forced expiratory volume, forced vital capacity). Thirty percent of individuals with more than 1 year of work experience had symptoms of breathlessness or cough. Individuals with 10 years or more of work experience showed a high prevalence of rales and reduced pulmonary function, as compared to those with shorter work histories. These findings indicate the urgent need for active follow-up of Israeli ex-asbestos workers. A proposed screening and surveillance program for this high-risk group is discussed with emphasis on follow-up, health education, and smoking cessation.

42. MORTALITY EXPERIENCE OF AMOSITE ASBESTOS FACTORY WORKERS: DOSE-RESPONSE RELATIONSHIPS 5 TO 40 YEARS AFTER ONSET OF SHORT-TERM WORK EXPOSURE

Seidman H, Selikoff IJ, Gelb SK

American Cancer Society, New York.

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A cohort of 820 men in a Paterson, New Jersey, amosite asbestos factory which began work during 1941-1945 was observed from 5 to 40 years after start of work. Most of the cohort had limited duration of work experience (days, weeks, months), though some men worked for several years until the factory closed in 1954. With white males of New Jersey as the control population, Standardized Mortality Ratios (SMRs) of 500 are evident for the cohort for lung cancer and for noninfectious pulmonary diseases (including asbestosis), while being almost 300 for total cancer and about 170 for all causes of death. A statistically significant SMR of almost 200 is seen for colon-rectum cancer. Mesothelioma incidence initially shows a strong relationship with advancing time since onset of exposure and then tails off. The main concern of the study is with dose-response patterns. Response is measured by the mortality for relevant causes of death, while the direct asbestos dosage was measured in two ways. One way was the length of time worked in the factory and the other was the individual's accumulated fiber exposure, calculated by multiplying the aforementioned length of time worked by the estimated fiber exposures associated with the particular job that the worker had in the factory. Whichever measure of dosage is used, it was found that, in general, the lower the dose, the longer it took for adverse mortality to become evident and, also, the smaller the magnitude of that adverse mortality.

43. ASBESTOS-RELATED MALIGNANCY

Antman KH

Department of Medicine, Harvard Medical School, Boston, Massachusetts.

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Due to the known association with asbestos exposure, malignant mesothelioma has assumed an importance out of proportion to its incidence in the American population (2.2 per million). Patients present with chest pain, shortness of breath, or both. The initial chest X-ray generally reveals a large unilateral pleural effusion. A large piece of tissue obtained via open biopsy is usually required for histologic diagnosis. Investigational approaches include multiple needle biopsies obtained for electron microscopy, as well as for immunoperoxidase staining for keratin and CEA. The tumor characteristically remains localized until late in its course. The treatment of mesothelioma remains unsatisfactory. However, anecdotes report long-term disease-free survival after intensive treatment. Palliation with a response rate of up to 30% to various chemotherapeutic regimens has been reported by a number of investigators. (176 Refs)