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Case-referent survey of young adults with mesothelioma: I. Lung fibre analyses.

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OBJECTIVES: Our study aimed to determine the lung tissue concentration of asbestos and other mineral fibres by type and length in persons with mesothelioma aged 50 yr or less at time of diagnosis, compared to controls of similar age and geographical region. In this age group it was thought that most, but not all, work-related exposures would have been since 1970, when the importation of crocidolite, but not amosite, was virtually eliminated.

METHODS: Eligible cases were sought from recent reports by chest physicians to the SWORD occupational disease surveillance scheme. Lung tissue samples were obtained at autopsy from 69 male and four female cases, and mineral fibres identified, sized and counted by electron microscopy. Fibre concentrations per microg dry tissue were compared with similar estimates from a control series of autopsies of sudden or accidental deaths. Unadjusted, and adjusted odds ratios calculated by logistic regression, assessed relative risk in relation to fibre type, length and concentration.

RESULTS: Unadjusted and adjusted odds ratios increased steadily with concentration of crocidolite, amosite, tremolite and all amphiboles combined. There was also some increase with chrysotile, but well short of statistical significance. Incremental risk examined in a linear model was as highly significant for all amphiboles together as individually. Short, medium and long amphibole fibres were all associated with increased risk in relation to length. Mullite and iron fibres were significant predictors of mesothelioma when considered without adjustment for confounding by amphiboles, but, after adjustment, were weak and far from statistically significant.

CONCLUSIONS: In this young age group, amosite and crocidolite fibres could account for about 80% of cases of mesothelioma, and tremolite for some 7%. The contribution of chrysotile, because of low biopersistence, cannot be reliably assessed at autopsy, but to the extent that tremolite is a valid marker, our results suggest that it was small. The steep linear trend in odds ratio shown by amphiboles combined indicates that their effects may be additive, with increased risk from the lowest detectable fibre level. Non-asbestos mineral fibres probably made no contribution to this disease. Contrary to expectation, however, some 90% of cases were in men who had started work before 1970; this was so whether or not amosite or crocidolite was found in lung tissue.

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