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Association between pleural plaques and coronary heart disease

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Objective The aim of this study was to verify a clinical impression that patients with coronary heart disease disproportionately frequently have calcified pleural plaques.

Methods Chest X-rays were collected from 148 patients referred consecutively to the Helsinki University Central Hospital for coronary angiography and from 100 consecutive lung cancer patients seen at the same hospital. The radiographs were analyzed for the presence of calcified pleural plaques according to the classification of the International Labour Office. A generalized linear model with binomial distribution and log link was used to estimate the relative risks and their 95% confidence intervals (95% CI).

Results The prevalence of calcified pleural plaques was 35% for the coronary patients and 19% for the lung cancer patients. Calcified pleural plaques were more common among the men than the women, and the risk increased with age. The relative risk of calcified pleural plaques, adjusted for age and gender, was 2.19 (95% CI 1.44—3.32) for the coronary patients as compared with the lung cancer patients.

Conclusions Further studies with better information on past exposure to asbestos and other potential risk factors are warranted to confirm the observations and to examine whether the association between coronary heart disease and calcified pleural plaques is related to an etiologic or an individual susceptibility factor common to both of these conditions.

Key terms asbestos exposure, etiology, lung cancer, susceptibility.

Exposure to asbestos is by far the most important, if not the only, known etiologic factor for pleural plaques (1). This conclusion is derived mainly from observations in cohorts with occupational exposure to asbestos or populations with life-long endemic exposure from asbestos-containing soil. The prevalence of pleural plaques is very high in Finland. In the general adult population, the estimated attributable fraction of occupational asbestos exposure for pleural plaques detected either in chest X-rays or in autopsies is not more than 50% (2, 3). The fraction of pleural plaques that cannot be attributed to documented past exposure to asbestos may be related to very low asbestos exposure that is difficult to reveal in epidemiologic studies or to other, unknown etiologic agents.

The aim of this study was to verify a clinical impression that patients with coronary heart disease disproportionately frequently have calcified pleural plaques.

Subjects and methods

We collected chest X-rays from 148 patients referred consecutively to the Helsinki University Central Hospital for coronary angiography and from 100 consecutive lung cancer patients seen at the same hospital. Lung cancer patients were chosen as the reference group because radiographs from these patients are readily available, their age distribution corresponds to that of coronary patients, and usually there are no other radiological changes that complicate the evaluation of calcified pleural plaques. Of the coronary patients, 101 were men and 47 were women, their mean age being 62.7 (range 37—83) years. There were 72 men and 28 women with lung cancer, their mean age being 62.9 (range 46—84) years.

The chest radiographs were analyzed for the presence of calcified pleural plaques according to the classification of the International Labour Office (ILO) (4).

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A dichotomous variable was formed (no calcified pleural plaques versus ≥ 1 calcified pleural plaques). No further information was available for the lung cancer patients, but, for the coronary patients, data on diabetes, hyperlipidemia, and smoking habits were accessible. Coronary stenosis of $\geq 50\%$ in at least one major artery in coronary angiography was regarded as a significant finding (prevalence 77% for the coronary patients). A further classification to 1-, 2-, or 3-vessel disease was also made. A generalized linear model with binomial distribution and a log link was used for the statistical analysis; it allowed for the estimation of relative risk (RR) and the 95% confidence intervals (95% CI). The analyses were performed both using all coronary patients and only those coronary patients with significant stenosis in the angiography. The results were very similar, and only those based on all the coronary patients are therefore given.

Results

The prevalence of calcified pleural plaques was 35% for the coronary patients and 19% for the lung cancer patients. For the coronary patients, calcified pleural plaques showed no association with the severity of coronary artery disease, diabetes, hyperlipidemia, or smoking. Calcified pleural plaques were more common among the men than the women, and the risk increased with age (table 1). The relative risk, adjusted for age and gender, was more than 2-fold greater among the coronary patients than among the lung cancer patients.

Discussion

We found a significantly increased prevalence of calcified pleural plaques for patients with coronary heart disease. Information was not available on past exposure to asbestos among these patients. To avoid an overestimation of the risk, the comparison was made with lung cancer patients, who presumably have a greater prevalence of past exposure to asbestos than the general population. The age- and gender-adjusted prevalence of calcified pleural plaques for both the coronary patients and those with lung cancer was, indeed, greater than that reported for a representative sample of the Finnish general adult population (5). A direct comparison with previously published results was, however, difficult because of differences in the distribution of age among the subjects and the degree of industrialization of the study areas.

Table 1. Risk factors for calcified pleural plaques. (RR = relative risk, 95% CI = 95% confidence interval)

Risk factor	RR	95% CI
Diagnosis		
Lung cancer	1.00 ^a	
Coronary disease	2.19	1.44—3.32
Gender		
Female	1.00 ^a	
Male	2.79	1.61—4.84
Age (years)		
≤ 59 years	1.00 ^a	
60–69 years	2.02	1.18—3.45
≥ 70 years	3.43	2.09—5.63

^a Reference.

Our result could be explained by a susceptibility factor common to calcified pleural plaques and coronary artery plaques or a common etiologic factor. One possibility is infection etiology; a question concerning the etiologic role of pulmonary and other infections in coronary heart disease has also been raised earlier (6). Further studies with better information on past exposure to asbestos and other potential risk factors are warranted to confirm our observations and to examine whether the association between coronary heart disease and calcified pleural plaques is related to an etiologic or an individual susceptibility factor common to both of these conditions.

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