

Chapter

1. Asbestos Exposure Assessment, Risk Identification, and Substitutes

Section

C. Epidemiology of ARDs

No./Title

13. Relation between lung asbestos fibre burden and exposure indices based on job history

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Introduction

Asian context

Most Asian countries still do not have the technology/expertise to measure lung asbestos fiber burden nor identify asbestos-related job history. This paper showed that lung asbestos fibre burden is correlated with past history of asbestos exposure determined by a careful interview.

Critical appraisal

Higher lung asbestos content paralleled with higher exposure indices for asbestos representing concentration, frequency, and reliability. These exposure indices as well as duration of exposure (in years) were independent predictors of total asbestos content in regression analyses when combined in a model with age.

Unique keywords

lung asbestos fiber, fiber burden, occupational history, interview

Abstract



Lung asbestos burden was compared with exposure indices derived from job history interviews in 42 male subjects originating from the Montreal Case-Control Study projects, 12 of whom had documented asbestos exposed job histories. Job interview data consisting of a chronological timetable of job histories were translated into detailed exposure indices by an expert group of hygienists and chemists. Total and individual asbestos fiber type concentrations were quantified by transmission electron microscopy with fiber identification by energy dispersive x ray spectrometry after deparaffinisation of tissue blocks and low temperature plasma ashing. Geometric mean or median asbestos content was higher in subjects with an asbestos exposed job history than those without for retained dose of amosite, total commercial amphiboles, and total asbestos fiber. Except for crocidolite fiber diameter, which was significantly less in the lungs of exposed workers, no consistent differences were found in measurements of fiber dimension for any fiber type. Subgroups of subjects exposed to silica, metals, or smokers and non-smokers without significant occupational exposure showed varying patterns of lung asbestos fiber type deficit compared with the asbestos exposed subgroup. There was an overall trend for higher lung asbestos content proportional to higher exposure indices for asbestos representing concentration, frequency, and reliability. These exposure indices as well as duration of exposure (in years) were independent predictors of total asbestos content in regression analyses when combined in a model with age. Stepwise regression indicated that exposure concentration was the most important variable, explaining 32% of the total variation in total asbestos content. Smoking, whether expressed in ever or never smoked dichotomy or in smoked-years, had no relation to lung asbestos content in this model.

Annotation

Fact 1

- A relation was found between level of retained lung asbestos fiber and exposure indices derived from job history.

Fact 2

- Duration of exposure significantly correlated with lung fiber content.

Fact 3

- A significant negative association was found between age at the time of post-mortem examination or pneumonectomy and lung asbestos retained dose. This may be related to asbestos clearance from the lung.

Fact 4

- Chrysotile was present in the lungs of 33% of workers and 37% of the unexposed subjects.

Fact 5

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References