Short communication

SENSITIZATION OF TIMBER INDUSTRY WORKERS TO COBALT AND FORMALDEHYDE

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ABSTRACT

Clinical investigation and patch testing in workers employed in timber industry are reported. In a group of 115 there were 4 times as many sensitized to cobalt (36.8 %) than to formaldehyde (9.2 %). The authors conclude that the relatively low incidence of sensitivity to formaldehyde is due to low concentration of this substance in the industrial environment which was investigated.

KEY WORDS:
sensitivity to cobalt and to formaldehyde, workers timber industry

INTRODUCTION

A team of the Dermatologic Clinic in Sarajevo examined workers in timber industry exposed to formaldehyde resin. The technological process included preparation and storage of arteficial resins, craft-paper impregnation with artificial resins and preparation of carriers for plates. During the proces the workers were exposed to liquid melamine resins. The ingredients were melamine ($C_6 H_6 N_6$) powder in paper bags and liquide formaldehyde (CH_20) in tanks. The melamine-formaldehyde resin was prepared by melting of 30% melamine, formaldehyde and 22 % NaOH, where formaldehyde acted as a hardener. The paper impregnation took place in special containers, subsequently the impregnated paper was glued to panel plates. The equipment was old, protection was adequate but workers often failed to use it. The investigation was carried out on request by the Service for protection of health at the factory, as the workers complained frequently of coughing, skin rashes, hoarsness and lacrimation.

MATERIALS AND METHODS

115 workers (89 males and 26 females) were examined and tested. The average age was 28 years and the duration of employment was between 2 and 10 years. For the majority this was their first employment, 30 % of them were previously employed in another facility where they worked cutting wooden material with a handsaw containing cobalt.

The patch tests were perfomed on the back, paravertebrally. The battery of standard tests included 12 allergens as well as 1 % formaldehyde, 2 % cobalt chloride, 10 % melamine

solution, a washing paste and Neopren glue /professional alergens/. The tests were removed at 48 hours and the results were interpreted after 48 and 72 hours. The positive results according to standard procedures were marked from 1+ to 4+.

RESULTS

During the clinical examination were detected the following skin conditions: varices crurum for 12, seborrhoic dermatitis for 9, contact dermatitis of the hands for 9 and dermatitis of the eyelids for 2 of the examined workers. Single cases of psoriasis, urticaria, tinea of the feet, lupus erythematosus chronicus, livedo and vitiligo were observed too.

Of the 115 workers tested 3 (36.8 %) were sensitized to cobalt, while only 8 (9.2 %) were sensitizet to formaldehyde, 7 (6 %) were sensitized to 20 % melamine solution and 2 (1.7 %) to Neopren glue. All positive tests were of 1 + intensity.

DISCUSSION

Formaldehyde is used during manufacture of paper, rubber, glues, textiles, cosmetics and detergents. Cigarette smoke and exhausts from cars also contain formaldehyde (1,2). Its mutagenicity was experimentally confirmed and the possibility of inducing skin and nasal carcinoma due to long term exposition needs to be considered (3). The sensitization to formaldehyde was confirmed (4). The present observation that only 9.2 % of workers were sensitized to formaldehyde is difficult to explain. Most likely the concentrations involved were too low to induce sensitization in a larger number of workers. The time needed for sensitization is also long. The fact that contact dermatitis of the eyelids was found in 2 workers may be explained by insufficient amount of formaldehyde to induce sensitization; however it may be adequate to maintain dermatitis in already sensitized individuals. The acetylating capacity of the human body may also play a role (5).

It is important to stress that cobalt and formaldehyde are present in the human environment and act as sensizizers. In the republics of former Yugoslavia sensitization to cobalt seems to be common (6.7). Vilplana et al (8) found that in a 5-year period the sensitivity to cobalt has doubled among housewifes, most probably due to the fact that the majority of detergents contain cobalt. Cement also contains cobalt (9).

In our battery of standard patch tests cobalt chloride was applied in a 2 % solution, although higher concentrations up to 10 % are mentioned in literature (10). Rysted (11) however used in her experiments very low concentrations, ranging from 0.5 to 0.0156 % cobalt in oil.

The authors believe that the majority of workers with a positive patch test to cobalt were sensitized to this substance during their previous employment, where they cut wood with a cobalt containing handsaw.

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