
LUNG CANCER RISK IN WORKERS EXPOSED TO SILICA IN THE CZECH REPUBLIC

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Objective: In 1997 the International Agency for Research on Cancer (IARC) evaluated dust containing crystalline silica and its thermal modifications, cristobalite and tridymite, as carcinogenic to humans (Group 1). The results of a great number of epidemiological studies confirm a statistically significant increase of lung cancer in the workers from various production areas with the risk of silicosis. The possibility of the increased risk of lung cancer in black-coal miners cannot be explicitly, according to the present knowledge, either confirmed or eliminated. Epidemiological investigation on silica exposure and lung cancer risk is the goal of two studies supported by grant of Czech Ministry of Health - No. 6578 Assessment of the carcinogenic risk in employees exposed to dusts containing quartz (2001 – 2003) and No. 8556 Longitudinal prospective study on carcinogenic risk in workers exposed to dust with content of crystalline form of silica dioxide in the Czech Republic (2005–2009). The goal of the presented study was to analyse lung cancer risk among workers with and without pneumoconiosis.

Material and methods: The first sample (S1) included 7,772 ex-miners who were working in the mining profession for at least 8 years. Coal workers' pneumoconiosis was diagnosed in about 10 % of miners. The second sample (S2) included 3,330 workers with pneumoconiosis from all industries and settings with occupational exposure to silica (74 % coal miners). These workers were registered in the National Register of Occupational Diseases in 1992–2001. The data on individual and occupational history of workers (S1, S2) were linked with the data from the National Cancer Register and the National Population Register. In presented study the sample included 3,330 workers with pneumoconiosis (P1) and 6,827 without pneumoconiosis (P0). Logistic regression model was used through Program Stata v.9 for analysis of association between lung cancer risk and pneumoconiosis controlled for age and smoking habits.

Results: Average age of workers (in consideration of diagnosed lung cancer, death and time of study) was 53.0 (SD 7.6) in P0, 60.1 (SD 11.7) in P1. Average exposure in years was 22.9 (SD 5.9) in P0, 21.9 (SD 8.8) in P1. In total 777 cases of cancer were diagnosed - 42.9 % in P0, 57.1 % in P1. Proportion of lung cancer from all cancers was 28 % (21 % in P0, 33 % in P1). Data about smoking habits was recorded in 90 % of workers, 81 % of them were smokers or ex-smokers. Results of logistic regression model performed significantly higher lung cancer risk for workers with pneumoconiosis – crude OR = 4.4 (CI: 3.3 - 5.9), age adjusted OR = 3.2 (CI: 2.4 - 4.3) and OR = 2.4 (CI: 1.7 - 3.4) controlled for age and smoking habits.

Conclusion: Preliminary results of this study support results of previous epidemiological investigation. Workers with pneumoconiosis are at higher lung cancer risk than workers without pneumoconiosis working in exposure to silica (OR = 2.4). Future analysis of this sample by occupation branches and more detail analysis of other risk factors will follow.

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