

Occupational Respiratory Diseases in the Czech Republic

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Abstract: This paper presents the profile of occupational respiratory diseases in the Czech Republic. In a retrospective study the author analyzes structure, causes, occurrence, and trends of occupational diseases. Between 1996 and 2000, a total of 2,127 new cases were recorded, of which 62.0% were pneumoconioses caused by dust containing free silica, 21.0% were occupational asthma or allergic rhinitis and the rest were divided between lung cancer (10.0%), asbestos-related disorders (4.4%) and variety of other respiratory diseases (2.7%). During the period of the investigations, the decreasing trend of occupational respiratory diseases, which began in 1992, has continued.

Key words: Pneumoconioses, Occupational asthma, Lung cancer, Asbestos related diseases

Introduction

The occurrence of occupational diseases is a very important indicator of the quality of working conditions and working environment.

Respiratory diseases are extremely important in that the lung is both a route of entry and a target organ for noxious occupational agents. These agents can become aerosolized or airborne in the form of fibers, fumes, mists, or dusts. The development of occupational respiratory disease is dependent on several factors, including the chemical nature and physical state of the inhaled substance, the size and concentration of the dust particles, the duration of exposure, and individual susceptibility¹.

Materials and Methods

This study presents a survey of the incidence of occupational respiratory or pleura disorders in the Czech Republic in the years 1996–2000.

In the Czech Republic occupational diseases have been registered since the end of the '50s. It has been performed according to a Decree of Ministry of Health and Social Affairs of the Czech Republic. In 1991, in the National Institute of

Public Health, Prague, National Registry of Occupational Diseases was founded under the supervision of the Institute of Health Information and Statistics (IHIS) of the Czech Republic. The basic source of information stored in the registry is the mandatory form "Report on Occupational Disease" (NZIS 0241) filled in by the physician who diagnoses the occupational disease. The diagnosis of occupational disease, however, is to be confirmed by an occupational health physician. Only 19 of the departments of occupational disorders ("notifying centres") are entitled to confirm and notify occupational diseases. In the Czech Republic, criteria for evaluation of occupational disorders were included in the List of Occupational Diseases (Appendix of Government Decree no. 290/1995). The List contains six important categories of occupational disorders with 83 entries².

Results and Discussion

Occupational respiratory diseases notified according to the category five of the List of occupational diseases accounted in 1996 until 2000 for 2,127 new cases, which represented 20% of all occupational diseases³. Table 1 summarizes the results.

Table 1. Registered cases of occupational respiratory diseases, Czech Republic, 1996–2000

Occupational disease	No. of cases	%
Silicosis and CWP	1319	62.0
simple	1144	53.8
complicated (with PMF)	95	4.5
silicotuberculosis	80	3.7
Asbestos-related pulmonary disease	94	4.4
Asbestosis	35	1.6
Pleural plaques, thickened pleura	22	1.0
Mesothelioma	25	1.2
Bronchogenic carcinoma	12	0.6
Arc welder's siderosis	28	1.3
Occupational lung cancer	214	10.0
ionizing radiation	203	9.5
polycyclic aromatic hydrocarbons	11	0.5
Extrinsic allergic alveolitis	27	1.3
Occupational asthma or allergic rhinitis	444	20.9
Occupational asthma	258	12.1
Occupational allergic rhinitis	121	5.7
Occupational asthma and rhinitis	65	3.1
Others	1	0.1
Total	2127	100.0

PMF: progressive massive fibrosis; N: Number of cases; CWP: coalworkers' pneumoconiosis.

During the period of investigation, the decreasing trend of respiratory diseases, which began in 1992, has continued. From 1996 to 2000, 538; 469; 387; 374, and 359 new cases per year, respectively, were registered.

Pneumoconioses was the oldest and best known of the occupational respiratory diseases. Lung disease from silica exposure has been reported for hundreds of years. Asbestosis has been recognised throughout much of last century.

Pneumoconioses caused by dust containing free silica occupied in the Czech Republic the first place (62% of all cases). Silicosis or coalworkers' pneumoconiosis were reported among various occupations, particularly those associated with exposure to silica or coal dust: in both surface and underground mining, tunnelling and quarrying, in foundries and the steel industry, ceramic and glass industries and construction. The greatest part of the pneumoconioses developed in coal mining (932 cases). Simple pneumoconiosis is further classified into major categories 1, 2, and 3 according to profusion, and into type p, q, r according to size of small rounded opacities in the lung fields. Among the simple pneumoconiotic cases, 351 was in category 2p, 1q, 1r according to the 1980 International Labour Organization classification of pneumoconioses⁴⁾, and 793

cases in category 3p, 2q, 2r-ILO or higher. 95 patients had large opacities (categories A, B or C) consistent with massive fibrosis. The mean age of the patients for simple and complicated pneumoconiosis was 53 years (range, 29 to 90 yr) and 63 (range, 32 to 76 yr) years in 2000, respectively. The length of exposure to silica or coal dust ranged from 3 to 44 years; mean 22 years. The positive decreasing trend of the number of silicosis and coalworkers' pneumoconiosis continues. The number of these pneumoconioses decreased from 357 cases in 1996 to 208 cases in 2000.

Occupational asthma and occupational allergic rhinitis became the second prevalent occupational lung diseases. In the majority of highly developed countries occupational asthma is the most frequent occupational respiratory disease. Since 1976 occupational asthma has been accepted as compensated occupational disease in the Czech Republic. These disorders occurred more often among women than men (2:1). Flours, animal epithelia, textiles, and isocyanates were important causes. Occupations at great risk, mainly from asthma, were bakers and other food processors, farm workers, health care workers, textile workers, plastics processors and manufacturers, welders, paint sprayers and chemical processors. Asthma cases were young, with a mean age of 38 years for men and 40 for women⁵⁾. All of these cases were confirmed by a bronchial challenge test, positive specific IgE tests or by detailed clinical evaluations. In the diagnosis of occupational asthma we apply the internationally recommended criteria⁶⁾. A procedure widely followed in some countries is to monitor the PEF at home and at work. However in our opinion the reliability of this procedure is much less than that of challenge tests.

Bronchogenic carcinoma has become the third prevalent respiratory disease in the Czech Republic. The lungs are highly sensitive to the carcinogenic effects of ionizing radiation. Underground miners of uranium tend to be at increased risk of lung cancer due to exposure to radioactive gas radon (²²²Rn) and its short-lived progeny, which are found in high concentration in such mines. This radiation exposure occurs mainly in the form of alpha radiation with some beta. Lung cancer of uranium miners depending on their former WLM (working level of month) exposure has been a compensated occupational disease. Between 1996 and 2000, 203 cases of bronchogenic carcinoma due to ionizing radiation were new reported. In 1996 there were 67 cases and in next years the annual number 45, 27, 29, 35 new cases, respectively, were registered. The mean age of the affected uranium miners was 69 (range 36 to 83) years. The mean duration of exposure to the underground environment in uranium mines was 13 years. Bronchogenic carcinoma

developed in 19 uranium mines silicotics.

Coke-oven work has been associated with increased relative risk of lung cancer due to exposure to polycyclic aromatic hydrocarbons. Occupational lung cancer is probably under-diagnosed and is certainly under-reported.

Asbestos has been associated with pleural plaques, parenchymal fibrosis (asbestosis) lung cancer, and mesothelioma. Asbestos-induced disorders included 35 cases of asbestosis and other asbestos induced disorders, such as lung cancer (12 cases), diffuse malignant mesothelioma (25 cases) and focal pleural plaques, areas of pleural thickening or calcifications (22 cases). The mean age at the diagnosis of diseases related to asbestos was 62 years and the mean duration of exposure was 22 years. Malignant pleural mesothelioma is a rare tumor associated with a very poor prognosis. There is no effective and definite treatment. Mesothelioma is almost always fatal; most patients affected die within a year of diagnosis. Asbestos related disorders were reported among various occupations. Diseases were associated with the job titles of asbestos cement industry-workers, insulation workers and other construction workers, heat-resistant textiles workers, production of brake linings.

Only findings of the deleterious effect on health led at the end of the second millennium to a worldwide restriction of mining and use of all types of asbestos.

Extrinsic allergic alveolitis (hypersensitivity pneumonitis) is a rare occupationally related pulmonary disease in the Czech Republic. In total, 27 cases of extrinsic allergic alveolitis were diagnosed among workers in this country. Numerous antigens became occupational hazards for many workers in a variety of industries. About 70% of these cases were farmers (farmer's lung). This disease occurs e.g. in the chemical industry (isocyanate alveolitis), in mushroom workers, malt workers, chicken raisers, textile and clothing industry as well as in wood-manufacturing plants.

Occupational chronic bronchitis is not eligible for compensation in the Czech Republic. In consequence patients

are not interested in the registration from a financial viewpoint.

In the years 1996-2000, a general decreasing trend in the number of reported occupational respiratory diseases was evident. The interpretation of the decrease is not simple. On the one hand, this may reflect the reduced number of people working at occupational risk and/or the improved hygienic situation at workplaces. However, on the other hand, we suppose that the motivation of workers for an absenteeism based on a pretended or actual occupational disease has significantly diminished. Consequently, we believe that the number of reported cases of occupational respiratory diseases in the Czech Republic is in fact underestimated⁷⁾.

References

- 1) Schwartz DA, Peterson MW (1998) Occupational lung disease. *Disease-a-Month* **44**, 1–84.
- 2) Cikrt M, Pelclova D, Markvart K, Lukas E, Kriz J (1997) Occupational and environmental medicine in Czech Republic. *Int Arch Occup Environ Health* **69**, 79–82.
- 3) CZECH Health Statistics: Occupational diseases 1996–2000. Institute of Health Information and Statistics of the Czech Republic, Prague (In Czech).
- 4) International Labour Office (1980) Guidelines for the use of ILO international classification of radiographs of pneumoconioses. *Occup Saf Hlth Series No. 22* (Rev. 80), Geneva, ILO.
- 5) Brhel P, Hassmanova V, Bousova K (2000) Profesionální astma v České republice. *Alergie* **2**, 84–9.
- 6) Chan-Yeung M (1995) Assessment of asthma in the workplace. *Chest* **108**, 1084–117.
- 7) Urban P, Cikrt M, Hejlek A, Lukas E, Pelclova D (2000) The Czech national registry of occupational diseases. *Cent Eur J Publ Health* **8**, 210–2.