DOI: 10.5152/TurkThoracJ.2019.95

[Abstract:0486] MS-134 [Accepted: Oral Presentation] [Occupational Lung Diseases]

Research and Clinical Experience for Bronchopulmonary System Damages in the Clean-up Workers of the Chornobyl NPP Accident (1988–2018)

Viktor Alexander Sushko[1], Lyudmila Ivanovna Shvayko[2], Kostyantin Dimitriy Bazyka[2], Olena Olexandrivna Kolosynska[1], Olena Valentinivna Apostolova[1], Alorna Sergyivna Rjazskaya[2]

[1]Division for Medical Expertise and Treatment of Ionizing Radiation Consequences, SI "National Research Centre for Radiation Medicine of The NAMS of Ukraine", Kyiv, Ukraine
[2]Department of Pulmonology, SI "National Research Centre for Radiation Medicine of The NAMS of Ukraine", Kyiv, Ukraine

Objectives: As a result of the Chornobyl NPP (ChNPP) nuclear accident a huge amount of radioactive substances came into the environment and were spread by the airborne dust flows that caused external and internal exposure (primarily inhalation) of the large contingents of population in low doses. At least 200.000 survivors of different categories had undergone an inhalation of radionuclides. The aim of the study was to summarize more than 30 years of researches for Bronchopulmonary System (BPS) Damages In Clean-up Workers (CUWs) of the ChNPP Accident.

Methods: Pulmonological examination included clinical (routine laboratory tests, X-ray), endoscopical, morphological (incl. electron microscopy), immunological and lung tests. Epidemiological and statistical methods were also used.

Results: The longterm (1996–2009) pulmonology investigation of more than 16,133 participants of the ChNPP accident consequences clean-up in 1986 testify to the reliable incessant increase of morbidity with ChB and COPD. Analysis of the relative risks of radiation, according to profound clinical and epidemiological survey (1992–2004) for 7,665 male COPD patients being CUWs in 1986–1987 with different doses of external exposure of the whole body showed a reliable connection of this disease with radiation exposure at doses higher than 250 mSv. In the group of patients with doses over 500 mSv in the remote postemergency period (2010-2015) a probable increase in the frequency of Lung Cancer (LC) was established (2.43% vs. 0.60% for the doses under 500 mSv ($p<0.01$). Radiation dose in the CUWs, who further developed LC, was higher (368.7±90.8) mSv than in those with no LC – (204.2±5.6) mSv ($p<0.05$). The course of COPD in CUWs in early years upon the accident was characterized by minimal clinical symptoms, followed however by the rapid development of fiber-plastic changes in the lungs and bronchial mucosa with progressive deformation of them, hyporeactivity of exacerbations and disorders of bronchial secretion, more severe clinical course was observed in remote period after exposure. Special clinical, functional, endoscopical, morphological, microbiological and immunological characteristics for development and course of radiation-induced pulmopathology were founded. The interdependence of lung function indicators and cellular immunity to dose ranges of less and more than 500 mSv was shown.

Conclusion: In the conditions of ChNPP accident BPS became one of the main "target" tissues for a combined action of external exposure and inhalation of the fission-fragment mixture of radionuclides, that hereinafter realized in radiation-induced pathomorphosys of pulmopathology (ChB, COPD, LC).

Keywords: Chornobyl NPP nuclear accident, radiation-induced pulmopathology, Chronic Bronchitis, COPD, Lung Cancer