

MERCURY EXPOSURE AND LUNG CANCER-URINARY LEVELS IN FEMALES WITH ADENOCARCINOMA

Mirjana Ševo^{1,2}, Danica Sazdanić Velikić^{1,3}, Nataša Milošević¹, Maja Milanović¹, Danijela Lukić⁴, Milorad Španović^{1,5}, Jan Sudji^{1,5}, Nataša Milić¹

¹*Faculty of Medicine, University of Novi Sad, 21000 Novi Sad, Serbia*

²*IMC Banja Luka-Center of Radiotherapy, Part of Affidea Group, 78000 Banja Luka, Bosnia and Herzegovina*

³*Institute for Pulmonary Diseases of Vojvodina, Clinic for Pulmonary Oncology, 21204 Sremska Kamenica, Serbia*

⁴*Institute of Public Health of Vojvodina, 21000 Novi Sad, Serbia*

⁵*Institute of Occupational Health Novi Sad, 21000 Novi Sad, Serbia*

e-mail: 902012d23@mf.uns.ac.rs

Abstract

It is predicted that one out of 17 women will develop lung cancer during the lifetime. Adenocarcinoma is recognized as the most frequent subtype of non-small lung cancers with almost 40% of total lung cancer and is more common in women than in men. Apart from cigarette smoking, secondhand smoking, and a lung cancer family history, environmental determinants of lung cancer are poorly understood. Although cadmium exposure is considered as a risk factor for lung cancer onset as well as mortality, the data about carcinogenic mercury (Hg) effects are still scarce.

In order to evaluate Hg exposure in lung cancer, 27 female patients (older than 18) with inoperable IIB and IV stadium of adenocarcinoma, diagnosed in the Institute for Pulmonary Diseases of Vojvodina, Serbia, were enrolled. The women were interviewed about their exposure to chemicals during lifetime and the presence of amalgam dental fillings. The body mass index (BMI) and waist-to-height ratio were calculated based on current weight, height and waist circumference for each patient. Total Hg levels were determined by inductively coupled plasma mass spectrometry (ICP-MS) in the morning spot urine samples after the microwave digestion with nitric acid. The urinary Hg levels was expressed in terms of $\mu\text{g/g}$ creatinine (Cre). Based on the obtained results, 52.26% (16/27) women were detected with Hg in urine samples above the limit of detection (1.9 $\mu\text{g/L}$) in the range 2.18 to 197.6 $\mu\text{g/gCre}$. There were no statistical differences in the mean values of urinary Hg between women with amalgam dental fillings in comparison to those without dental fillings i.e. 34.39 ± 66.46 versus 11.29 ± 8.56 $\mu\text{g/gCre}$ ($p=0.346$). One should note that although no statistical differences were observed, women without dental fillings had higher Hg urinary levels indicating other sources of exposure. In addition, the obesity nor central obesity had no influence on urinary Hg concentration. There were no differences in Hg urinary levels between normal weight ($\text{BMI} \leq 25 \text{kg/m}^2$) and overweight ($\text{BMI} > 25 \text{kg/m}^2$) women ($p=0.548$). Moreover, no statistically significant variations in urinary Hg levels were registered between women with healthy waist-to-height ratio below 0.5 and those with values above 0.5 ($p=0.168$).

The obtained results could enable a better understanding of heavy metal exposure as environmental determinants of lung cancer.

Acknowledgement: This work was supported by the Provincial Secretariat for Higher Education and Scientific Research, AP Vojvodina, Republic of Serbia (Grant No. 142-451-3509/2023-01).