

Preliminary study on possible influence of elemental mercury during pregnancy

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Methylmercury (Me-Hg) is a well-documented neurotoxicant, which may cause adverse effects on the developing brain (WHO, 1991). Neurotoxic effects of the occupational elemental mercury (Hg⁰) exposure is also known (WHO, 1976, 2003). Although Hg⁰ easily penetrates the placental barrier not many investigations of a possible influence of prenatal low level Hg⁰ exposure on the pregnant women and their newborn children have been made. Hg mining in Idrija has contaminated all parts of the Idrija town. In the last decade air Hg⁰ concentration has been decreased, but the estimated retention of Hg⁰ is still over the retention in general population (WHO, 1991). The purpose of the present work was to observe changes of mercury in whole blood (B-Hg) and urine (U-Hg), superoxide dismutase (SOD), glutathione peroxidase (GPx) and catalase (CAT) in erythrocytes, selenium in whole blood (B-Se), plasma (P-Se) and urine (U-Se), and ferritin in serum during pregnancy, and to evaluate the relationship between mother and child.

The study included eleven mercury exposed pregnant women living in Idrija and seven non-exposed pregnant women as a control group. The blood and urine samples from mothers were taken in the first and last trimester and the cord blood was taken at the time of birth. Erythrocyte Cu Zn-SOD and GPx activities were assessed by using a Randox test kits on the Roche/Hitachi 917 analyser. Erythrocyte CAT activity was assayed by a modified enzymatic test according to Aebi. Total mercury in whole blood and urine was determined by CVAAS. Blood, plasma and urine Se concentrations were determined by AAS with the Zeeman background correction. Serum ferritin and urine creatinine concentrations were assayed with the routine clinical chemistry methods.

The main conclusions indicate that (1) the mercury concentrations in blood and urine in the exposed group were not significantly higher than those in the control group; (2) the mean SOD activity from the exposed pregnant women was significantly higher than that of the control group ($p < 0,01$); (3) we found the mean P-Se, B-Se, ferritin concentration, and GPx activity lower in the 3rd trimester of pregnancy than in the 1st trimester, but only P-Se and ferritin concentrations were significantly lower ($p < 0,001$); (4) significant differences in SOD activities and P-Se concentrations were found between the 1st trimester of pregnancy and the cord blood samples in both groups, whereas no significant difference was found between 3rd trimester of pregnancy and cord blood samples, except in the control group, where P-Se concentrations were significantly lower ($p < 0,02$) and SOD activities were higher ($p < 0,02$); (5) the following correlations during pregnancy in the exposed group were observed: U-Se and P-Se ($-0,471$; $p < 0,03$), B-Se and ferritin concentrations ($0,891$; $p < 0,02$) and between B-Se and B-Hg ($0,818$; $p < 0,05$) in cord blood samples.

The results of B-Se, P-Se and GPx are in the accordance with the results represented by Zachara et al. (1993), where decreasing of these parameters probably showed increased requirement for the element during pregnancy, the same applies to ferritin results. SOD demonstrates an increased activity to the oxygen radical production, although no significant difference of Hg° has been noted during pregnancy in the cord blood between both groups. We can not conclude that mercury has not influenced the children, which is probably due to the low level of Hg° exposure and a small number of subjects observed.

KEYWORDS: *Mercury, Pregnancy, SOD, GPx, Catalase*

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