

Indicatori urinari ed ematici di dose interna di mercurio in lavoratori di un impianto clorosoda e in soggetti non professionalmente esposti: relazione con gli amalgami dentali ed il consumo di pesce di mare

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KEY WORDS

Inorganic mercury; methylmercury; amalgam fillings; fish consumption

SUMMARY

«Urinary and blood levels of mercury among chloralkali workers and non occupationally exposed subjects: relationship with amalgam fillings and fish consumption». Objectives: *The aim of this paper was both to evaluate the internal dose of Hg in occupationally exposed workers (35 Chloralkali workers) compared to that of non occupationally exposed controls (40 workers of the same plant of Portoferraio and 22 residents on the island of Carloforte, usual consumers of local fish, mostly tuna fish with relatively high Hg levels) and to assess the relevance of environmental and individual exposure factors linked to lifestyle, sea fish consumption and amalgam fillings.* Methods: *All subjects filled out a questionnaire concerning the working history and lifestyle. The amalgam fillings area was measured by medical inspection using a standardised schedule attached to the questionnaire. Mercury in urine (HgU) was measured in all cases, while in a subgroup of our study total blood mercury (HgB) and its organic and inorganic component were also assessed. Furthermore, for 8 of the Carloforte group mercury in hair was also available.* Results: *Values of urinary mercury excretion of the Chloralkali workers were significantly higher (median value of 15.4, range 4.8-35.0 µg/g creatinine, 94.3% of the cases having values >5 µg/g creatinine) than those observed both among the reference group (median value of 1.9, range 0.4-5.6 µg/g creatinine, 12.5% of the cases having values a little greater than 5 µg/g creatinine) and among the residents in Carloforte (median value of 6.5, range 1.8-21.5 µg/g creatinine, 59.1% of the cases having values >5 mcg/g creatinine). The HgU values observed in this group were in turn significantly higher than those of the non occupationally exposed workers living near Sassari (p=0.03). Only in this last group were the HgU concentrations statistically significantly related to the extension of the amalgam fillings area (Pearson r=0.53, p<0.01). In the Carloforte group HgU was significantly related to the number of fish meal consumed per week (Pearson r=0.48, p<0.02). HgB (median value of 5.9, range 3.4-21.6 µg/l) as well as its inorganic component (median value of 2.4, range 1.8-4.6 µg/l) were significantly higher in the Chloralkali group compared to the other two groups. In all cases of the Carloforte group the ratio between the organic component and the total HgB was higher than 85%, while this ratio was significantly lower in*

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*the other two groups. The relationship between HgU and HgB was statistically significant, considering both total blood mercury and the inorganic and the organic components separately. A statistically significant relationship between the sea fish consumption per week and both total HgB (Pearson $r=0.82$) and the organic component in this matrix (Pearson $r=0.84$, $p<0.001$) was observed among 16 non-occupationally exposed subjects. However, the significant relationship between organic blood mercury and sea fish consumption was almost entirely supported by the data observed in the Carloforte group. Total hair mercury levels analysed in 8 subjects of the Carloforte group were high (median value of 9.6, range 1.4-34.5 $\mu\text{g/g}$) and significantly related to sea fish consumption, and to both the individual Hg urinary excretion (Pearson $r=0.83$) and to the organic component of blood mercury (Pearson $r=0.87$). **Conclusions:** According to several experimental human and animal trials and to some recent studies on methylmercury toxicokinetic models, our results suggest that the organic compounds absorbed by usual sea fish consumption may be partially demethylated, increasing the inorganic Hg concentration in the kidney and consequently its urinary excretion, as was observed in the Carloforte group.*