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Effetti neuroendocrini e neurocomportamentali associati con esposizione a basse dosi di mercurio derivanti da consumo abituale di pesce di mare

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KEY WORDS

Organic mercury; neurobehavioral tests; fish consumption

SUMMARY

«Neuroendocrin and neurobehavioral effects of low-level methylmercury exposure through fish consumption».

Objectives: *To evaluate neuroendocrine and neurobehavioral effects possibly associated with increased dietary intake of organic mercury (Hg), a group of 22 subjects living on the island of Carloforte (south-west Sardinia) was examined, who were regular consumers of tuna fish with relatively high Hg content. This group, never exposed occupationally to either Hg or to other neurotoxic substances, was compared with 22 age-matched controls employed at a chemical plant in Portotorres (northern Sardinia).* Methods: *Hg in urine (HgU) and serum prolactin (PRL) were measured in all cases, whereas measurements of total (HgB) and organic blood mercury were available only for 10 subjects from Carloforte and 6 controls. Data about working history and lifestyle (education, smoking habit, alcohol and sea fish consumption) were collected by an interviewer using a standardised questionnaire. Neurotoxic symptoms were evaluated by a self-administered questionnaire, whereas a test battery, including some computerised tests of the Swedish Performance Evaluation System (SPES) to assess vigilance and psychomotor performance, some tests on motor coordination (Luria-Nebraska and Branches Alternate Movement Task) and one memory test for numbers (Digit Span) was administered to assess neurobehavioral changes associated with exposure to dietary intake of organic mercury. In all cases, characteristics of hand tremor were evaluated by the CATSYS™ System 7.0.* Results: *HgU values were significantly higher in the Carloforte group (median 6.5, range 1.8-21.5 μg/g creatinine) compared with controls (median 1.5, range 0.5-5.3 μg/g creatinine). Serum PRL was significantly higher among subjects from Carloforte and correlated with both urine and blood Hg levels. The scores of each item of the questionnaire investigating neurological symptoms were not statistically different in the two groups. In some tests of the SPES battery (Color Word Vigilance, Digit Symbol and Finger Tapping) the performance of the Carloforte group was significantly worse than that of controls, whereas in the other neurobehavioral tests poorer performances by the Carloforte group were not statistically significant. None of the tremor parameters was significantly different comparing the two groups. Multivariate analysis - controlling for education level and other covariates - carried out for the Symbol-Digit Reaction Time and for the Branches Alternate Movement Task (BAMT) showed that organic*

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Hg concentration in blood was the most significant factor negatively affecting individual performance in these tests. Serum PRL was correlated with some neurobehavioral tests (Digit Symbol, Finger Tapping and BAMT). Conclusions: *Some of the neurobehavioral tests were sensitive enough to discriminate groups with different Hg body burden, even in the low-dose range. However, the pattern of results suggests adverse neurobehavioral effects, especially on psycho-motor coordination, with a significant dose-effect relationship, mostly associated with long-term exposure to low levels of organic mercury due to the usual consumption of large fish with relatively high levels of Hg in the flash.*