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ABSTRACT BOOK

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A CASE-CONTROL STUDY OF NEUROTOXIC METALS IN CEREBROSPINAL FLUID AND RISK OF AMYOTROPHIC LATERAL SCLEROSIS

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Many studies have investigated the possible relation between exposure to heavy metals and risk of amyotrophic lateral sclerosis (ALS). We aimed at assessing the levels of two neurotoxic metals, cadmium (Cd), lead (Pb) and mercury (Hg) in cerebrospinal fluid (CSF) of ALS patients and hospital controls. CSF heavy metal content was determined using inductively coupled plasma sector field mass spectrometry (ICP-SF-MS) according to methodologies previously established for biological matrices and specifically for CSF. We obtained CSF samples from 38 ALS cases, including 16 men and 22 women, and from 38 hospital-referred subjects undergoing lumbar puncture because of suspected but later unconfirmed neurological disease, with mean age of 55.5 and 52.26 respectively (range 30–85). Median heavy metal concentrations were higher in ALS cases compared to controls for Pb (155 vs. 132 ng/l) but lower for Cd (36 vs. 72) and Hg (196 vs. 217). In unconditional multiple logistic regression analysis adjusting for age and sex, we found a disease odds ratio (OR) for the middle and the upper exposure tertiles of 0.8 (0.2-2.6) and 1.4 (95% CI 0.5 to 4.2) for Pb, 0.9 (0.3-2.8) and 0.3 (0.1 to 1.0) for Cd, and 12.4 (2.7-57.3) and 3.03 (0.52-17.55) for Hg. We also conducted sensitivity analyses with log transformed values and with winsorized values by setting data exceeding the 95th percentile to the 95th percentile, but the risk estimates did not substantially change. Our results and particularly the lack of dose-response relations give little support for an involvement of these heavy metals in ALS etiology, with the possible exception of Hg. However, caution should be used in the interpretation of these results due to some study limitations, such as the statistical imprecision of the risk estimates, the hospital-based design of the study, and the potential for unmeasured confounding.

P-45