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PROGRAM AND ABSTRACTS

Brain MRI and manganese exposure

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The paramagnetic properties of manganese allow a particular suitability for magnetic resonance image (MRI) study of brain deposition and accumulation of this metal. Brain MRI has shown the same T1-hyperintensity in globus pallidus in intoxicated workers, in patients with liver failure and in subjects with parenteral nutrition. A recent survey conducted by our group has also demonstrated these results in 7 asymptomatic workers exposed to lower doses of manganese (median blood manganese = 13 μg/l, range 7-16; median urinary manganese = 1.02 μg/g creatinine, range 0.37-4.46; median exposure length = 16 years, range 3-38). A positive correlation has been observed in all these situations between blood manganese and the pallidal index defined as the ratio of globus pallidus to subcortical frontal white-matter signal intensity in sagittal T_1-weighted MRI planes multiplied by 100. On the other hand, the PI does not correlate with indicators of neuropsychological effects, or with indices of cumulative exposure. In addition, the hyperintesity regresses after a few months after the cessation of exposure. In this paper we compared the different patterns of exposure to manganese and MRI hyperintensity between the available studies in the literature, regarding workers at different degrees of exposure and liver patients In conclusion, MRI seems to accurately reflect the deposition of manganese in globus pallidus as a product of current exposure and not of the manganese accumulation in the brain due to cumulative exposure. Therefore, MRI outcomes are not necessarily related to the effect parameters that are generally associated with the cumulative amount of absorbed manganese. Although MRI is suitable for the detection of Mn brain accumulation, a more precise quantification of this phenomenon is needed in order to examine dose-response relationships more accurately.