Welding and metals

19 BASAL GANGLIA INTENSITY INDICES AND DIFFUSION WEIGHTED IMAGING IN MANGANESE-EXPOSED WELDERS

Susan Criswell,¹ Joel Perlmutter,¹ Nima Golchin,¹ Hubert Flores,¹ Angela Hobson,¹ Michael Aschner,² Keith Erikson,³ Harvey Checkoway,⁴ Brad Racette¹ ¹*Washington University, St. Louis, USA;* ²*Vanderbilt University, Nashville, USA;* ³*University of North Carolina, Greensboro, USA;* ⁴*University of Washington, Seattle, USA*

10.1136/oemed-2011-100382.19

Objectives Manganese exposure leads to diffuse cerebral metal deposition with the highest concentration in the globus pallidus associated with increased T1-weighted MRI signal. T1 signal intensity in extra-pallidal basal ganglia

(caudate and putamen) has not been studied in occupationally exposed workers. Diffusion weighted imaging (DWI) is a non-invasive measure of neuronal damage and may provide a quantification of neurotoxicity associated with welding and manganese exposure. This study investigated extra-pallidal T1 basal ganglia signal intensity as a marker of manganese exposure and basal ganglia DWI abnormalities as a marker of neurotoxicity.

Methods 3T MR imaging was performed on 18 welders and 18 age- and gender-matched controls. Basal ganglia regions of interest were identified for each subject. T1-weighted intensity indices and apparent diffusion coefficients (ADC) were generated for each region.

Results Indices for all regions were higher in welders than controls ($p < 0.05$). Combined basal ganglia ($r = 0.489$), caudate ($r = 0.571$), and posterior putamen ($r = 0.511$) indices were more correlated with exposure hours than pallidal ($r = 0.335$) index. Welder ADC values were lower than controls for globus pallidus ($p = 0.04$) and anterior putamen ($p = 0.005$).

Conclusions Welders demonstrated elevated T1 indices throughout the basal ganglia. The combined basal ganglia, caudate, and putamen indices were more correlated with exposure than the pallidal index and may represent better markers of exposure. Elevated indices were associated with DW abnormalities in the globus pallidus and anterior putamen suggesting neurotoxicity in these regions.