



POSTER PRESENTATION

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# Quantifying spinal cord cross-sectional area in HTLV-1 associated myelopathy/tropical spastic paraparesis (HAM/TSP)

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The inflammation and subsequent atrophy of the spinal cord are thought to underlie the debilitating symptoms of HAM/TSP. Although spinal cord atrophy can be qualitatively detected on routine clinical MRI, a robust and sensitive method to quantify changes in spinal cord size might capture disease processes. We have developed a novel and fast algorithm to determine the average cross-sectional area in the cervical (c-spine) and thoracic (t-spine) spinal cords by tracing contours perpendicular to the edge in T1-weighted MRI images. The cross-sectional areas in the c- and t-spines were determined in 11 HAM/TSP, 10 multiple sclerosis (MS), and 7 healthy control subjects. Average cross-sectional area in both the t-spine and c-spine were significantly lower in HAM/TSP patients (t-spine:  $26.1 \pm 5.0 \text{ mm}^2$ ; c-spine:  $51.9 \pm 6.8 \text{ mm}^2$ ) as compared to MS patients (t-spine:  $39.7 \pm 8.9 \text{ mm}^2$ ,  $p=0.0004$ ; c-spine:  $68.9 \pm 11.6 \text{ mm}^2$ ,  $p=0.0005$ ) and healthy controls (t-spine:  $43.5 \pm 5.5 \text{ mm}^2$ ,  $p<0.0001$ ; c-spine:  $84.2 \pm 10.9 \text{ mm}^2$ ,  $p<0.0001$ ). Appreciating the small sample size, t-spine cross-sectional area correlated with blood serum proviral loads ( $r=-0.62$ ,  $p=0.04$ ,  $n=9$ ) and with clinical disability measured by EDSS and IPEC. These results suggest that the pattern of spinal cord tissue damage is specific to the underlying inflammatory disease, a finding that has direct implications for the use of average cross-sectional spinal cord area as a surrogate end point for clinical trials.

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