

METABOLITE CHANGES FROM MR SPECTROSCOPY IN THE CERVICAL SPINAL CORD IN PATIENTS WITH CERVICAL SPONDYLOSIS

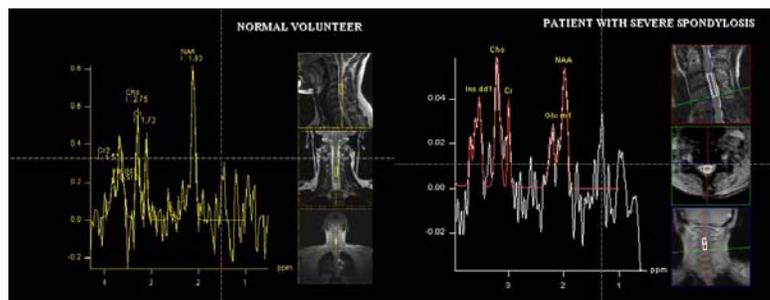
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PURPOSE: Neurosurgical triage of patients with cervical spondylosis is highly dependent on demonstrating abnormal spinal cord signal at conventional MR imaging; however, changes in spinal cord function and clinical symptomatology precede findings of abnormal cord signal. The purpose of this study is to compare metabolite ratios from the cervical cord of normal volunteers with measurements in patients with cervical spondylosis.

MATERIALS AND METHODS: We obtained single voxel spectra at 1.5T using MAGNETOM systems (Siemens Medical Solutions, Erlangen, Germany) from 6 normal volunteers and 8 patients with cervical spondylosis. The ¹H SVS protocol uses a modified PRESS sequence, allowing the use of 5 mm voxels as well as pulse/ECG triggering. The measurements were acquired with TE = 30 ms, 256 averages, voxel size = 5 x 7 x 30 mm, weak water suppression, a vector size of 256 and pulse triggering with average TR values of 590 ms. After placing a small voxel in the target region of the upper cervical spinal cord (posterior to the C3 vertebral body), an automated shim was performed, followed by manual shimming if needed.

RESULTS: The relative ratios of metabolites for the normal volunteers versus patients with spondylosis were: NAA/Cr ratios 2.08 ± 0.34 and 0.99 ± 0.29 ($P < 0.05$) respectively, Cho/Cr ratios 1.24 ± 0.36 and 1.45 ± 0.55 ($p = 0.21$) respectively, Ins/Cr ratios 0.75 ± 0.43 and 0.52 ± 0.36 ($p = 0.27$) respectively, and Cho/NAA 0.62 ± 0.24 and 1.51 ± 0.61 ($p < 0.05$) respectively. There was a statistically significant decrease in NAA/Cr ratio and elevation in Cho/NAA in symptomatic patients with spondylosis.



CONCLUSION: The study suggests that changes in metabolite ratios can be detected in patients with cervical spondylosis before the typical signal cord changes are seen on T2-weighted images. The decrease in NAA is thought to be due to early neuronal/axonal compromise and the increase in Cho felt to represent increased membrane turnover secondary to early demyelination or glial proliferation changes.

Acknowledgement: * The pulse sequence was provided by Jan Ruff, Ph D Siemens Medical Solutions, Inc, Erlangen, Germany.

REFERENCES:

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