Elevated Choline/Creatine Ratio in Central Nervous System Arterial infarction: Frequency, Timing, Extent and the Effect of Echo Time.

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Abstract:

Purpose: To evaluate the frequency, timing and extent of the elevation of choline/creatine ratio on MRS in patients with arterial infarcts and determine if MRS pattern in subacute infarcts is sufficiently different from that of a neoplasm.

Materials & methods: Twenty nine patients with arterial infarcts were evaluated with single voxel proton MRS using PRESS sequence at TE 136 and 272, between 6 hours and 93 days after the onset of symptoms. Seventeen normal volunteers served as controls. Choline/creatine, N-acetyl aspartate/creatine and lactate/creatine ratios were calculated. Differences between data points were measured using Mann-Whitney U test. Correlation between metabolite ratios and infarct stage was tested using Pearson's test. Differences between measurements made using different echo times were tested with Wilcoxon's test.

Results: Choline/Creatine ratio exceeded 1.8 in 38% of the spectra at TE 136 and 24% of the spectra at TE 272. Only choline/creatine ratios correlated significantly with infarct stage. Correlation was better at TE 272 ($p<.01$) than at TE 136 ($p<.05$). Choline/creatine was significantly ($p<.05$) greater in patients in late subacute and chronic stages than controls. In the subacute stage, lactate/creatine was significantly greater at TE 272 than TE 136 ($p<.05$).

Conclusion: Significant elevations occur in choline/creatine ratio during late subacute and chronic stages of arterial CNS infarction. MRS alone may be misleading in differentiating subacute infarct from tumor when choline/creatine ratio is the sole criterion. Echo time of MRS may significantly alter metabolite ratios measured.