

THE RELATION OF BRAIN MATTER VOLUME AND MYO-INOSITOL TO GAMMA-GLUTAMYLTRANSFERASE AND BMI IN PATIENTS WITH ALCOHOL DEPENDENCE AND HEALTHY CONTROL SUBJECTS

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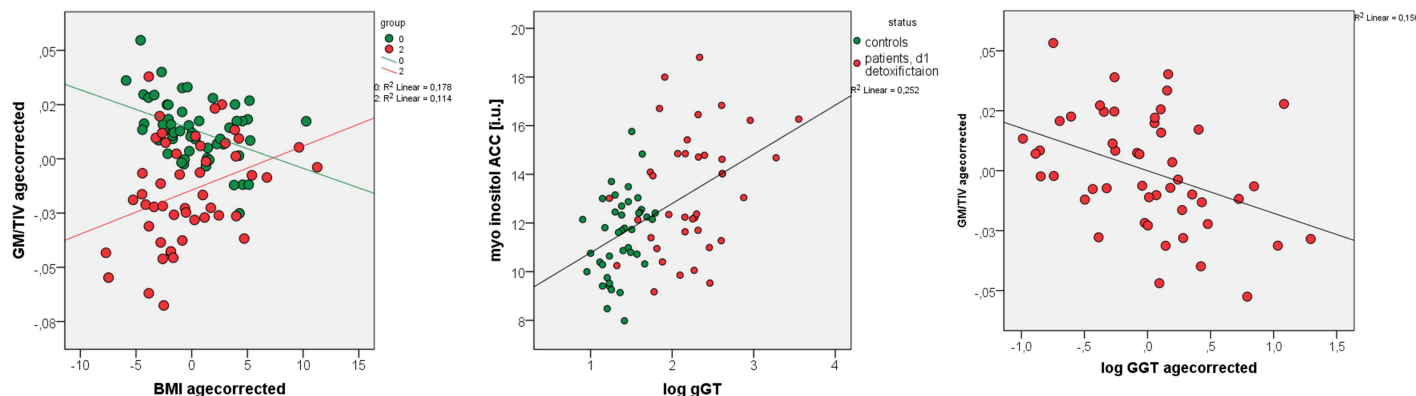
Target Audience: Scientists interested in MR morphometry and spectroscopy in alcohol dependent subjects.

Purpose: To investigate possible correlations between morphometric and spectroscopic brain measures with gamma-glutamyltransferase (gGT) and the body mass index (BMI) in chronic alcohol dependent patients during early withdrawal and healthy control subjects.

Methods: 38 alcohol dependent patients on the first day of withdrawal (30 male, age 20-65 ys) and 41 healthy controls (28 male, age 21-63) were analyzed. The MRI images and spectra were acquired on a 3T Siemens Tim Trio system (Erlangen, Germany). For morphometry analysis a T1-weighted MPRAGE sequence with a whole-brain coverage (192 slices, 1 mm slice thickness, 256 mm field of view, 1 mm³ resolution) was acquired. The imaging data have been processed using the voxel-based morphometry toolbox (VBM8, <http://dbm.neuro.uni-jena.de/vbm/>) implemented in the SPM8 package (<http://www.fil.ion.ucl.ac.uk/spm/software/spm8/>). Additionally single voxel MRS (15 x 30 x 12 mm³) from the anterior cingulate cortex (ACC) was acquired with a PRESS sequence using the following parameters: echo time 80 ms, repetition time 3000 ms, bandwidth 2400 Hz, 2048 data points, and 100 averages. Quantification of spectra was based on LCModel spectral fitting and the unsuppressed water signal. Detailed VBM and MRS results from this study without considering gGT and BMI have been published in [1,2].

Results: BMI was negatively correlated with whole brain gray matter (GM) in healthy controls but positively in alcohol dependent patients (Fig 1). Of the quantified metabolites only myo inositol (mI) showed a slight interaction with BMI but only in healthy controls not in patients.

gGT was found to be negatively correlated with whole brain GM in patients and controls and was positively correlated with mI again for both groups separately.



Discussion: Our BMI findings corroborate recent reports on GM volume and BMI: Negative BMI correlations with brain volume have been reported for healthy controls by Bobb et al [3]. Whereas Chen et al.[4] did not find a sign. correlation in healthy controls but a positive correlation in alcohol dependent patients. Whether higher BMI is protective against alcohol induced GM shrinkage needs to be further investigated.

Chen et al further reported a negative correlation of gGT with GM which is also corroborated here. To the best of our knowledge no study has yet reported a positive correlation of mI with gGT. mI is a substance that crosses the blood-brain-barrier. gGT is involved in the transfer of amino acids across the cellular membrane. It is indicated to exert a prooxidant role, with regulatory effects at various levels in cellular signal transduction and cellular pathophysiology.

References: [1] van Eijk et al. Alcohol Clin Exp Res 2013; 37(1):67-74 [2]Hermann D et al. Biol Psychiatry. 2012; 71(11):1015-21. [3] Bobb JF Hum Brain Mapp. 2012 [Epub ahead of print]; [4] Chen CH et al Alcohol Clin Exp Res. 2012 Apr;36(4):625-32.