Spectroscopy study of schizophrenic male patients with and without auditory hallucinations

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Purpose: The aim of this work is to correlate biochemical alterations in different brain locations (hippocampus and basal ganglia) in chronic schizophrenic male adult patients with and without auditory hallucinations.

Subjects and Methods: MR spectroscopy studies (1.5 T clinical MRI unit, Philips Gyroscan Intera, The Netherlands) were performed in 21 schizophrenic male patients (17 hallucinators, chronic and episodic, and 4 not hallucinators, mean age of 42 years) and 2 control subjects. A single volume 1H magnetic resonance spectroscopy (1H MRS) (25x18x18 mm, TR 2000 ms, TE 31 ms; 256 measurements, 1024 samples to improve the study of Glu and Gln) was located in the left hippocampus. Moreover, a 1H MRSI with 2 transversal slices (TR 2700 ms, TE 272 ms, with a region of interest of 110x100x23 mm) was localized including the basal ganglia and hippocampus. All spectra were transformed and analyzed with jMRUI and SIView (Spain) programs. Relative values of N-acetylaspartate (NAA), Creatine (Cr), Choline (Cho), and Glutamate and Glutamine levels in the left hippocampus were compared among groups in each region. The homogeneity of the magnetic field was verified by means of the width of the H2O signal in a nonsuppressed solvent sequence.

Results: The average width of H2O signal was 6.12 Hz. In the left hippocampus and in both groups of patients, NAA and ml decreased whereas Glu (2.34 ppm) and Glx (2.12 ppm) increased with respect to controls. An increment in Gln (2.45 ppm) was observed, lower in the no hallucinators group. In the 1H MRSI a bilateralisation with decrease of neuronal viability in right basal ganglia was found.

Discussion/Conclusion: Recent studies suggest that alterations in the Glutamate neurotransmitter might have an important role in the schizophrenia. MR spectroscopy showed differences between control subjects and schizophrenic patients, and between schizophrenic patients with and without auditory hallucinations.