Brain GABA levels in patients receiving ECT. Preliminary findings from a case-control study.

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INTRODUCTION

• Electroconvulsive Therapy (ECT) is by many clinicians regarded as the most effective acute treatment of major depression1 and has been used for more than 70 years.2

• Still, the mechanism of action of ECT is unknown, but already in 1983 a possible mechanism implying GABA was presented3. In 2003 Sanacora4 published findings strengthening this hypothesis.

• This study is part of a larger, multidisciplinary ongoing project investigating the mechanisms of ECT.

METHODS

• Brain GABA levels of 12 patients and 6 healthy controls were measured.

• All patients were treated with right upper unilateral brief pulse (0.5 ms) ECT.

• Patients received either thiopental or propofol as an anesthetic.

• ECT was given 3 times a week for 3-6 weeks.

• Time points for measurement: 1-2 hours before first treatment (pre-treatment) and approximately one week after treatment series (post-treatment).

• Acquisition by a 3 T GE 750 Discovery MR scanner with 32 channel head coil.

• MEGA PRESS was used for single-voxel point resolved spectroscopy5.

• Editing was done by a 16 ms 180 degree pulse applied at 1.9 ppm and 7.5 ppm, see Figure 2.

• Acquisition parameters: TE=68 ms, TR= 1500 ms, 192 averages on each on- and off acquisition, giving total acquisition time of 10 min.

• Voxel was placed in the midline of the anterior cingulate cortex (ACC) and measured 3x3x3 cm, see Figure 1.

• GABA quantification by Ganne6. Tissue correction was applied2.

• Pre-processed spectra were assessed according to standard signal quality metrics, as well as visual inspection.

• Statistical analysis was performed by use of SPSS. Datapoints were normally distributed and t-tests were used for comparing groups.

RESULTS

• No changes were found in GABA levels for patients (GABA -8.4%, p<0.1, n=8).

• For controls at similar time points: -2.7% (p=0.9, n=6).

• There was no significant difference between patients and controls pre-treatment.

CONCLUSIONS

• Results are preliminary and the number of patients limited.

• No statistically significant changes in GABA levels between pre-treatment and post-treatment measurements.

• There was no difference in GABA levels pre-treatment between patients and healthy controls.

• The increased GABA levels found by Sanacora in the occipital cortex could not be found in the ACC.

REFERENCES


