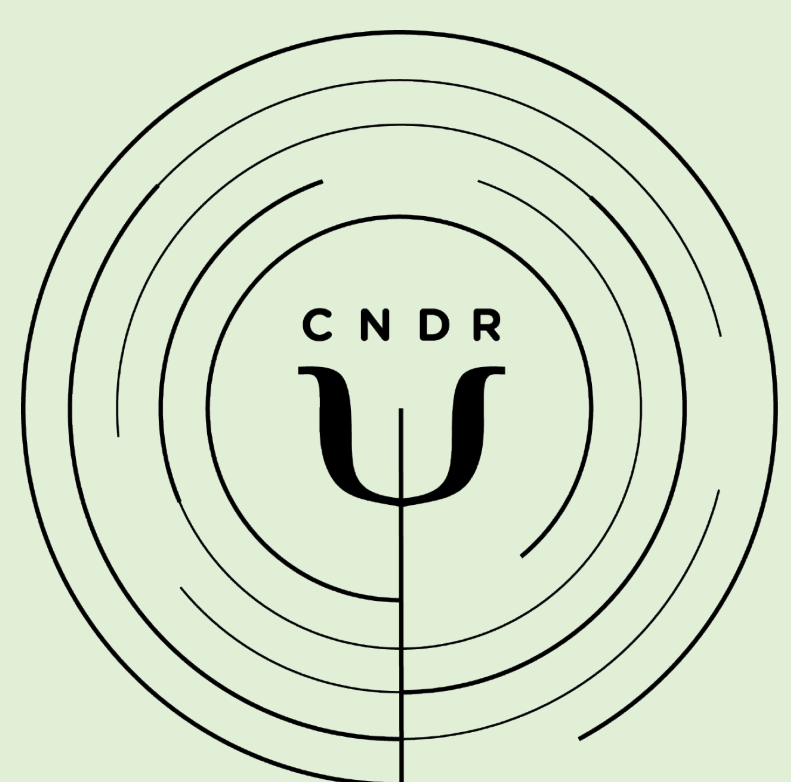




Effect of a single electroconvulsive therapy session on the blood-brain barrier permeability – a pilot study

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REGION

BACKGROUND

Electroconvulsive therapy (ECT) is one of the most effective treatments of severe and psychotic depression. Cognitive adverse effects limit the use of the treatment. The neurobiology of these cognitive adverse effects is largely unknown. We speculate that increased blood-brain barrier (BBB) permeability after ECT could be involved.

Animal studies suggest ECT transiently increases the BBB permeability, but the evidence in humans is sparse. Increased BBB permeability and subsequent fluid shifts could explain the consistently documented grey matter volume increase in the hippocampus (HC) after ECT. This volume increase is present two hours after the first treatment and is associated with cognitive adverse effects.

METHODS

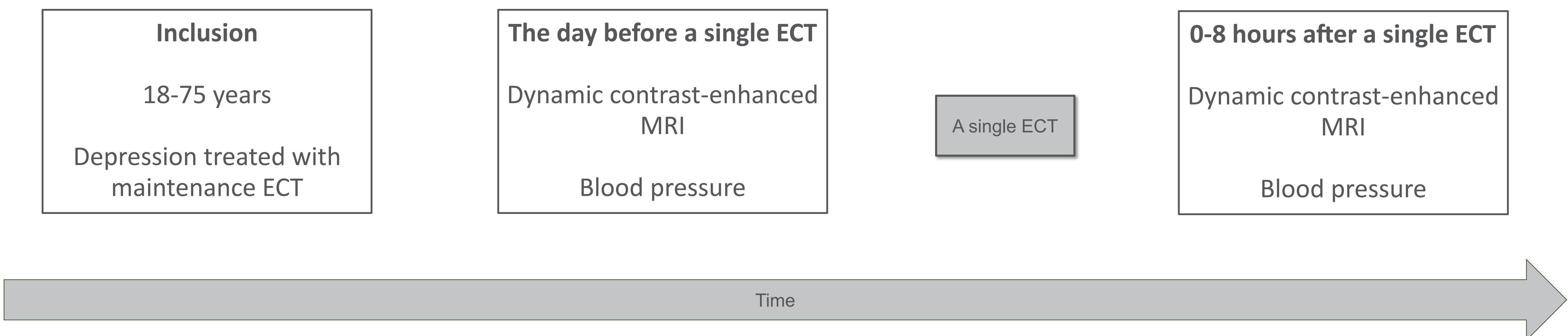
This pilot study measures BBB permeability changes after a single ECT session with dynamic contrast-enhanced MRI and T2-relaxation times. We plan to include 10 patients treated with maintenance ECT due to unipolar or bipolar depression.

PRIMARY HYPOTHESIS

The BBB permeability increases in the bilateral HC after ECT.

SECONDARY HYPOTHESES

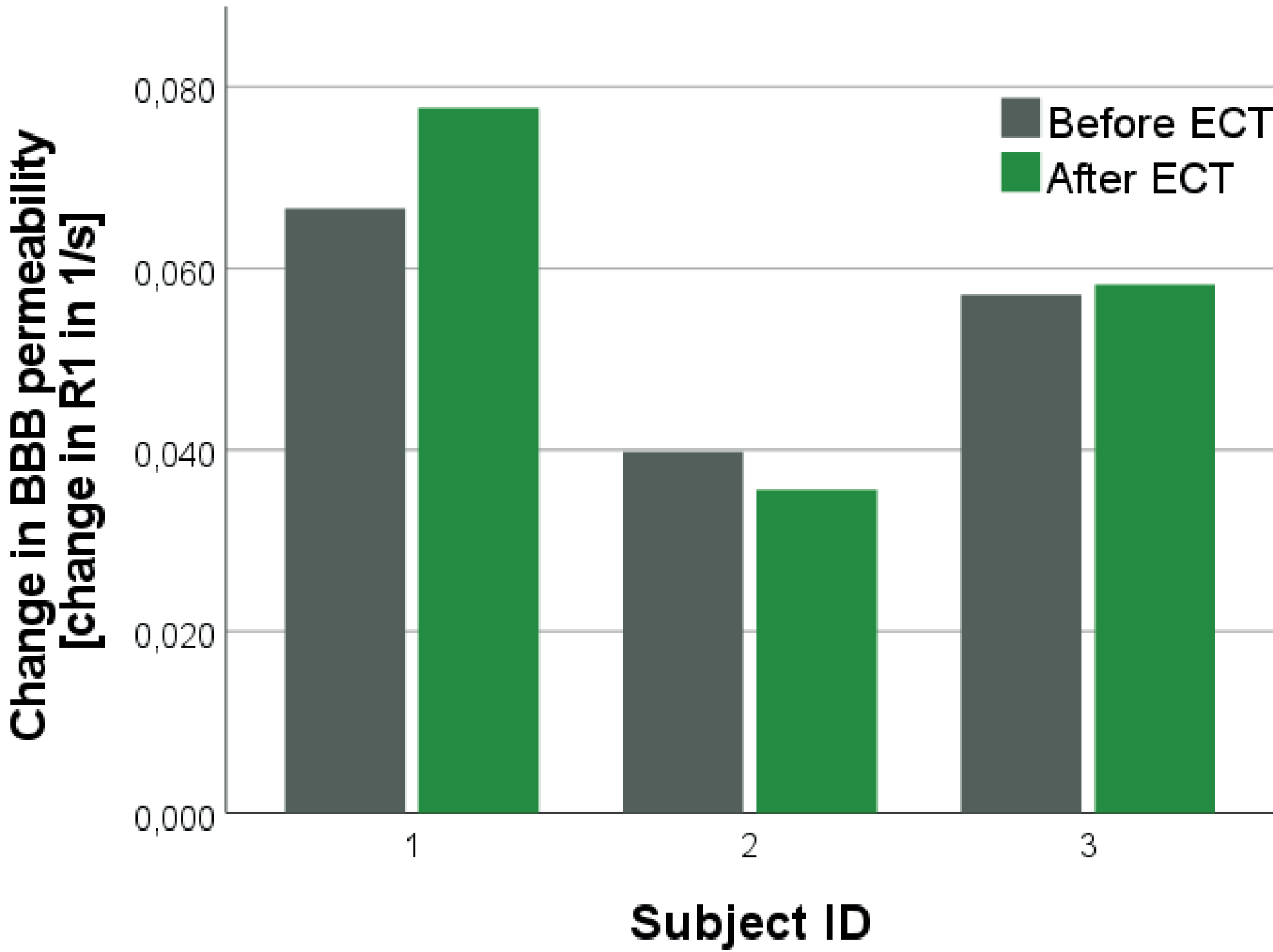
The post-ECT increase in BBB permeability correlates with an increase in 1) systolic blood pressure and 2) HC volume.



PRELIMINARY RESULTS

Three patients treated with maintenance ECT have been included. BBB permeability as K_i has not yet been calculated. The change in relaxation rate, R1 is a measurement of the amount of contrast that has entered the HC. Larger R1 equals more contrast in the HC and therefore larger permeability to the contrast agent. A positive post-pre change in R1 means the BBB is more permeable to the contrast agent after ECT.

Figure 1



PERSPECTIVES

Cognitive adverse affects after ECT are a major concern for both patients and health professionals limiting the use of this highly effective treatment.

Reducing the increase in systolic blood pressure during ECT could prevent the increase in BBB permeability and, as a result, the increase in HC volume known to associated with cognitive adverse effects.

Figure 2

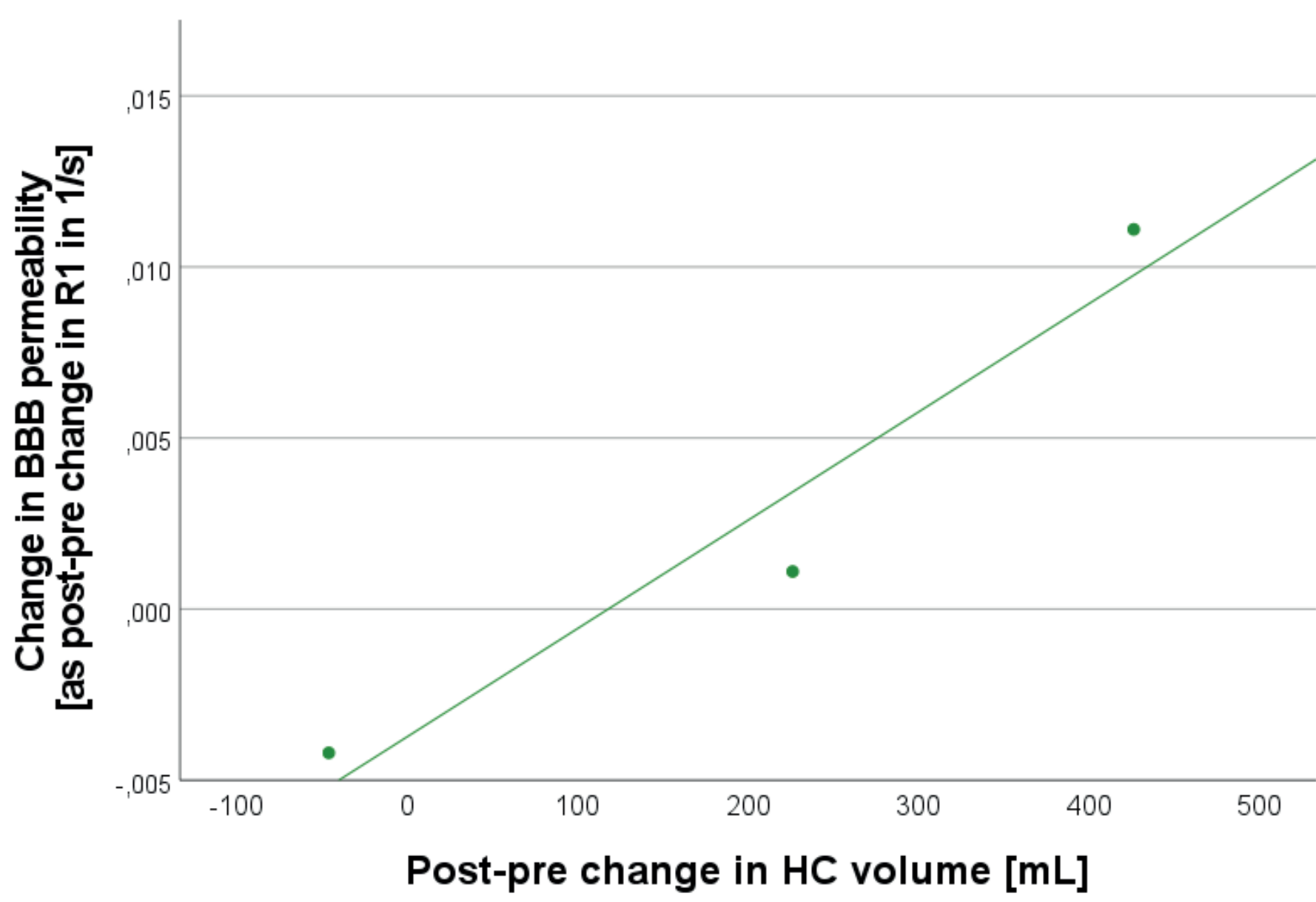


Figure 3

