To the Editor:

Recently, Ousdal et al. (1) reported widespread changes in cortical and subcortical volumes after electroconvulsive therapy (ECT). They reported that although the number of ECT sessions is associated with changes in multiple volumes in the brain, clinical response is not. While their analyses are sound and open up new research avenues, and their dataset is adequately powered, an important question remains.

Ousdal et al. (1) found that subcortical gray matter, cortical gray matter, and ventricle volume changed significantly compared with control subjects after ECT. Specifically, they showed that ECT induced significant volumetric increases in nearly all gray matter regions of interest (ROIs) (33 cortical [left and right] and 8 subcortical ROIs) except for the left and right cerebellar cortex (false discovery rate corrected). Furthermore, ventricle volume decreased significantly, while total white matter volume remained the same. The results of Ousdal et al. are an important milestone in showing that ECT is not related to harmful processes such as atrophy and cell necrosis, which would result in volume decreases.

However, an important question concerning the association between volumetric changes of the subcortical, cortical, and ventricle volumes and the clinical response (i.e., remission of depression) remains unanswered. Are these broadly distributed changes just an epiphenomenon of ECT, or are there certain changes in specific ROIs related to the antidepressant effects of ECT? To this end, Ousdal et al. (1) analyzed the change in Montgomery–Åsberg Depression Rating Scale score (pre- and post-ECT) and volumetric change, while controlling for age, sex, site, baseline depression score, number of ECTs, number of ECTs squared, and the respective baseline volumes in a simple linear model. No significant associations between any of the 84 gray matter ROIs and change in Montgomery–Åsberg Depression Rating Scale score were found. In contrast, using ultra-high-field 7T magnetic resonance imaging, our group showed that the dentate gyrus (DG) of the hippocampus significantly increased in volume after 10 ECT sessions (2). Importantly, the increase in DG volume was related to the decrease in Hamilton Depression Rating Scale score, and baseline DG volume could predict clinical effect. Aside from the fact that we used ultra-high-field magnetic resonance imaging and subfield analysis, we also employed linear mixed modeling and repeated-measures correlation to investigate the effects of ECT. Repeated-measures correlation may be more sensitive in detecting a relationship between two variables in a repeated-measures design than the analysis of differences and repeated-measures correlation to investigate the effects that add to the antidepressant properties of ECT.

Jasper O. Nuninga
René C.W. Mandl
Iris E.C. Sommer

Acknowledgments and Disclosures

This work was supported by an Apasia Grant from the Netherlands Organization for Scientific Research to IECS.

We thank the Netherlands Organization for Scientific Research for the Apasia Grant, allowing us to conduct the research mentioned in this paper.

The authors report no biomedical financial interests or potential conflicts of interest.

Article Information

From the Department of Biomedical Sciences of Cells and Systems (JON, IECs), University Medical Center Groningen, University of Groningen, Groningen; and Department of Psychiatry (JON, RCWM), University Medical Center Utrecht Brain Center, Utrecht University, Utrecht, the Netherlands.

Address correspondence to Jasper O. Nuninga, M.Sc., at j.o.nuninga@umcutrecht.nl.

See also associated correspondence: https://doi.org/10.1016/j.biopsych.2020.05.031.

Received Mar 23, 2020; accepted May 27, 2020.

References


