Significant Improvement in Electroconvulsive Therapy (ECT) for the Treatment of Depression

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Technology description

Background

The electroconvulsive therapy (ECT) success rate in depressive disorders, the most common diagnostic indication for the estimated 100,000 annual ECT treatments in the U.S., is approximately 75%. During a typical four-week ECT series, most depressive episodes remit, and formerly suicidal or psychotically depressed patients will resume their premorbid levels of functioning. Independent of the antidepressant effect of ECT, many patients experience debilitating but transient cognitive effects such as attention and memory deficits. These unwanted side effects are particularly troubling for older patients who are more likely to have existing cognitive deficits. ECT research to date has focused on the role of stimulus delivery (electrode placement, pulse amplitude, and pulse width) to maintain efficacy and reduce cognitive impairment. Certain forms of ECT (ECT delivered at seizure threshold, for example) are ineffective despite seizure induction. Furthermore, the seizure morphology and duration are not associated with clinically effective treatments. Both lines of evidence suggest that an alternative neurophysiologic process may be responsible for ECT’ s antidepressant properties and mechanism of action.

Technology Description

Researchers at the University of New Mexico have detected a neurophysiological mechanism that is distinct from seizure activity that may be related to the therapeutic (or iatrogenic) properties of ECT. Commercially available ECT devices measure seizure activity between 0.2 to 90 hertz and are subsequently unable to detect this neurophysiological process. The mechanism of action of this process functions as a “hard-reset” to brain circuitry and may be responsible for the neuroplasticity commonly associated with antidepressant treatments.

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Application area

Applicable to other diagnostic indications for ECT including catatonia, psychosis and mania

Advantages

Novel approach to non-invasive measurement of distinct neurophysiological process
Potential identification of therapeutic (or iatrogenic) components of ECT
Improved optimization of neuromodulation parameters to improve clinical outcomes
Clinical monitoring of the "hard-reset" will be used for titrating and informing clinical decision making for electrotherapy

Institution

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