A review of electroconvulsive therapy in suicidality

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Abstract
Introduction: Suicidal thoughts and behaviors are highly associated with major psychiatric illnesses, including depression, schizophrenia, and substance related disorders. Suicide is a major cause of death in individuals with mood disorders, and mortality rates are markedly higher in this patient cohort compared with those without mental illness. The estimated lifetime rate of suicide in those with schizophrenia, major depressive disorder, and bipolar disorder are 6.0%, 14.6%, and 15.5%, respectively, as compared with 0.72% in the general population.

Methods: A literature search was conducted for empirical evidence of affect of suicidality with electroconvulsive therapy.

Results: Available evidence suggests electroconvulsive therapy may reduce the risk of suicide in various patient populations.

Discussion: This review seeks to summarize a selection of the pertinent literature describing electroconvulsive therapy’s effects on suicidality.

Keywords: ECT, suicidality, suicide, suicidal behavior, suicidal ideations, electroconvulsive therapy

Introduction
Electroconvulsive therapy (ECT) is a nonpharmacologic treatment indicated for symptoms of severe mental illnesses, including psychosis, mania, catatonia, and depression. Such treatment may also be beneficial in reducing suicidal thoughts and behaviors. An ECT session involves the successive application of electrical current to the brain, with the goal of producing a generalized seizure discernable on an electroencephalogram. During the procedure, the clinician places 1 (unilateral) or 2 (bilateral) electrodes on the patient’s head; a seizure is induced by applying brief-pulse stimulation techniques while the patient is under anesthesia and neuromuscular blockade. The therapeutic mechanism of ECT is not well studied or defined. It is thought that a single ECT procedure induces a myriad of changes in the central nervous system, including a surge in circulating corticotropin, prolactin, and cortisol; changes in the immune system; and increases in platelet serotonin transporters. Hippocampal neurogenesis may also occur. The number of treatments in an ECT course varies and is determined by patient response. A course of 6 to 12 sessions over 2 to 4 weeks usually results in...
remission of symptoms from a depressive episode in 55% to 86% of individuals.\textsuperscript{3,7}

Many published studies document the efficacy of ECT for depressive illnesses.\textsuperscript{2} The rapid onset of its beneficial effects is a key advantage of ECT over pharmacotherapy, which may take up to 4 to 8 weeks or longer to reach a therapeutic level.\textsuperscript{7} Despite documented efficacy and low side-effect risk, ECT is often recommended as a “treatment of last resort” because of its reputation as being a less-safe treatment option.\textsuperscript{6}

Decades of research and clinical experience have resulted in the improved procedure and technique of modern-day ECT. Present ECT uses sedation, muscle paralysis, ventilation with oxygen, and brief-pulse electrical stimuli. These techniques virtually eliminate the past risk of fracture and decrease the risk of transient cognitive dysfunctions.\textsuperscript{2} The most-frequent immediate adverse effects with current procedures are headache, nausea, and vomiting.\textsuperscript{8} Mortality rates with ECT are very low, and most deaths are commonly associated with general anesthesia risk.\textsuperscript{2} Transient cognitive disturbances, including anterograde and retrograde amnesia, can still occur, although the incidence has been reduced with improved technique. Anterograde memory impairment has been observed to recover to baseline levels by 1 month after the procedure.\textsuperscript{8,11} Retrograde amnesia is more common with bilateral ECT.\textsuperscript{14} Studies using objective measures, such as the Autobiographical Memory Interview, which investigates memory for past events, find retrograde amnesia to be relatively short lived, usually lasting less than 6 months after treatment.\textsuperscript{11,12} The number of treatments, the intensity of the stimulus, the bilateral electrode placement, the duration of the seizure, and the exposure to subthreshold stimuli have all been correlated with increased cognitive risk.\textsuperscript{7}

The 2010 American Psychiatric Association guideline for major depressive disorder\textsuperscript{2} recommends ECT “be considered as a potential treatment option for all patients with major depressive disorder who have psychotic features or catatonia and for those with an urgent need for response, such as patients who are suicidal or who are nutritionally compromised.” The 2013 Veterans Affairs Department of Defense (VA-DoD) guideline\textsuperscript{8} for the Assessment and Management of Patients at Risk for Suicide recommends ECT be considered for “rapid resolution of suicidal symptoms in patients with major depressive disorder, manic episodes, bipolar I depression, PTSD [posttraumatic stress disorder], and acute schizophrenia.” The guidelines also suggest ECT may be considered after failure of pharmacotherapy or when patients prefer treatment leading to rapid remission.\textsuperscript{9} Overall, the treatment guidelines continue to recommend ECT for those patients who require rapid-acting treatment.

### Methods

An initial search was made through PUBMED using search terms ECT and suicidality, ECT and suicide, ECT and suicidal behavior, ECT and suicidal ideations, electroconvulsive therapy and suicidality, electroconvulsive therapy and suicidal behaviors, and electroconvulsive therapy and suicidal thoughts. A MEDLINE search was completed to verify all relevant resources were included. For the purposes of this review, suicidality includes suicidal ideation and suicidal behaviors.\textsuperscript{3,5} Studies that directly observed the effects of suicidality with ECT are summarized.

### Literature Review

The search strategy revealed 1 cohort study, 1 retrospective review, 1 case controlled study, and 5 case reports describing the effect of ECT on suicidality.

Kellner et al\textsuperscript{3} looked at data from the first phase of an ongoing, collaborative, multicenter study and proposed that ECT could have a profound short-term benefit in suicidal patients. In a cohort of 148 patients with suicidal ideation who had received ECT, the authors found rapid and robust reductions on item 3 of the Hamilton Depression Rating Scale (HDRS), which rates suicidal thoughts and acts. After 3 ECT sessions, 38% of patients had complete resolution of their suicidal ideations. As the number of ECT sessions increased, so did the resolution of suicidal ideations. The investigators recommended that ECT be considered earlier in the course of treatment for patients at risk for suicide.\textsuperscript{8}

Patel et al\textsuperscript{14} also noted more-rapid improvement in depression and expressed suicidal intent in a group of 30 patients receiving ECT compared with a control group receiving pharmacotherapy alone. Patients who were selected to receive ECT received between 5 and 10 treatments given bilaterally 3 times/wk. Patients were given the 24-item Brief Psychiatric Rating Scale shortly before and within a week after the conclusion of the ECT treatment course. There was significant improvements shown by ECT-treated patients on the Brief Psychiatric Rating Scale depression and suicide-scale item scores.\textsuperscript{7}

Sharma\textsuperscript{15} presented results of a case-control study examining the use of ECT in a group of 45 inpatients who completed suicide at a psychiatric hospital. Nearly 16% of suicide victims received ECT during the final 3 months. All of the patients who committed suicide (n = 3) who completed ECT were considered nonresponders or partial responders. Only 1 control participant was considered to have shown a favorable response. Most patients who committed suicide following completion of the course of ECT did so within 2 months, and those who declined to have further treatment killed themselves within a week of
the final ECT. The results of that study suggest the delayed-response ECT may have on suicide completion; however, further studies are needed in this area.

Gambil et al reported a case of a patient with an 18-year history of mental illness, characterized by paranoid and grandiose delusions, depression, and several suicide attempts. Following an unsuccessful suicide attempt, the patient received 7 bilateral ECT treatments resulting in improved depression and temporary cessation of suicidal ideation. Rapinesi et al also reported a case of a patient admitted to their clinic after previous hospitalization for a suicide attempt. The patient had a diagnosis consisting of bipolar disorder I, histrionic personality disorder, and suicidal ideation. After multiple drug failures, most recently with lithium, quetiapine, haloperidol, escitalopram, and desmethyl diazepam, ECT was recommended to the patient. Eight sessions of ECT were administered using bitemporal placement. Starting from the first session, the patient improved dramatically, especially in mood, anxiety, and agitation, with the disappearance of suicidal ideation and self-harm. Nine months after patient’s discharge, no suicidal ideations were reported or observed. The report demonstrated ECT to be immediately effective against suicidal thoughts and acts, in the setting of bipolar disorder.

Tavares et al presented a case of a schizoaffective patient with a history of 8 life-threatening suicide attempts. The patient was recently being treated with varenicline for tobacco cessation along with lithium and ziprasidone for maintenance treatment of mental disorder. Following 1 month of varenicline, the patient presented with increased energy, grandiosity, irritability, impulsivity, voices commenting on her, paranoid ideation, frequent crying, and continuous suicidal ideation, with a specific plan. She recovered with 6 bilateral, bitemporal ECT sessions. They recommend that ECT be considered for suicidality in the context of varenicline-adjunct therapy for smoking cessation in schizoaffective patients.

Most recently, Kobeissi et al reported a case of an 88-year-old patient who was admitted to a psychiatric unit after a carefully premeditated suicide attempt. The patient was started on paroxetine and low dose olanzapine at 2.5 mg at bedtime, after which, irrational suicidal deductions remained unchanged. The patient agreed to a trial of ECT. After a single session of ECT, the patient’s HDRS-24 score dropped from 25 to 6. The patient was observed to have complete cessation of suicidal ideations at 3 and 5 months after ECT.

Discussion

There appears to be some evidence demonstrating the reduction of acute risk of suicidality with ECT. Indications considered for the use of ECT in suicidal patients may include the seriousness of the intent, short-term risk of suicide, or the need for more-emergent treatment as mentioned in the treatment guidelines. The number of treatments required to produce antisuicidal effects are not well established; however, disappearance of expressed suicidal intent may occur very early in the course of treatment. It is important to note the great limitations to the studies available regarding ECT in suicidality, including the overall lack of randomized trials and the weak study designs. The possibility of publication bias may highlight the positive effects of ECT on suicidality. Most of the studies failed to disclose any side effects that patients may or may not have encountered after intervention with ECT. In addition, it was not always clear whether medications were continued or discontinued before ECT administration. This could have great impact on how to best interpret the data available. Also, in most cases, the assessment of the effects of ECT on suicidality was secondary to the primary goals of the studies; therefore, any changes in suicidality associated with ECT may have been secondary to the treatment response of the mental illness (ie, depression) to ECT. Despite this, with the evidence available, there is compelling data to support the rapid resolution of expressed suicidality in patients who receive ECT, which, therefore, warrants greater attention.

Conclusion

Although not robust, some evidence supports the specific antisuicidal effect of ECT. Despite its well-documented efficacy and safety, ECT continues to be widely stigmatized as a last-resort treatment. The misperceptions of risks associated with ECT may contribute to limitations of use and levels of recommendations. Evidence suggests that ECT can be a valuable treatment option in appropriately selected, suicidal patients, including those in need of rapid resolution of suicidal symptoms; however, more well-designed studies are needed to examine this issue.

References


