ECT Efficacy and Controversies with Dr. Cummings

Manal Piracha M.S., Darcy Temple, M.D., Brandon Kitay, M.D., David Puder, M.D.

Introduction

In this episode of the podcast, we sit down with Dr. Cummings to discuss the benefits, progress, and fears related to electroconvulsive therapy. For years the efficacy of electroconvulsive therapy has been debated, but we've learned that it still remains an essential part of psychiatric treatment in patients with severe mental health disorders. A recent article published in The Independent called, "Thousands of women given 'dangerous' electric shocks as mental health treatment in England", continues to spread fear in regards to the severe adverse effects of ECT. The article claims that the therapy is not much better than the placebo. The article references its information from a paper written by an academic psychologist Dr. Read, in which he argues that ECT has had no significant outcomes or benefits. Dr. Cummings subsequently in 2021 wrote a rebuttal critiquing the work of the ECT antagonists and Dr. Read's paper. We discuss the claims and how ECT has shown to improve the lives of patients with severe mental health illness.

What is electroconvulsive therapy?

Electroconvulsive therapy (ECT) is a psychiatric procedure conducted under general anesthesia that uses electricity to induce a therapeutic generalized tonic clonic ("grand mal") seizure with the goal of improving a patient's severe mental health condition. Although it has been a controversial topic in the field of psychiatry, it is a method that has made a significant impact in the lives of patients suffering with severe major depression disorder, bipolar disorder, catatonia and schizophrenia. ECT is rapidly more effective than the antidepressant medications, mainly due to its speed of effect. The antidepressants work by altering the levels of neurotransmitters that are released, such as serotonin and norepinephrine. It produces changes in the second messenger signals inside the cells, which lead to changes in gene expression that promote plasticity and influence connectivity between neuronal networks involving these neurotransmitter systems (Vialou et al, 2013) . In contrast, ECT induces changes at multiple levels of brain organization and function by diffuse electrical stimulation that influences both neurophysiology and endogenous neurotransmitter release. These rapid effects at the cellular and molecular level also seem to converge on a mechanism of enhancing synaptic plasticity and therefore altering connectivity on a temporal and regional scale greater than what traditional oral antidepressants can afford (Singh et al, 2017; Leaver et al, 2021). However, researchers are still trying to understand the contribution of seizure physiology which is important in the clinical response to ECT. For example, whether it's the activation of a large number of neurons via direct electrical stimulation or the immediate post-seizure quiescent period that causes ECT to be so efficacious (Fosse et al, 2013).

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In the Nottingham ECT study, 69 patients took part in a double-blind study to investigate the efficacy of bilateral, unilateral and simulated ECT in the treatment of depressive illness. In this study they looked at the value of MADRS, a scale that psychiatrists use to measure the severity of depression, and how the number changed with the use of unilateral, bilateral and simulated ECT. The study found that unilateral and bilateral ECT are highly effective treatments for depression and significantly superior to the simulated ECT. Evidence also suggested that patients who received bilateral ECT recovered more rapidly and needed fewer treatments than those receiving unilateral ECT.

TABLE I

Change in scores before and after treatment (percentage change in brackets)

	Simulated ECT group	*Unilateral ECT group*	*Bilateral ECT group*
MADRS	8.70 (75.29)	24.00*** (30.61)	24.76*** (22.35)
HDRS	13.90 (65.51)	30.53** (29.33)	28.00** (26.76)
PIRS	2.55 (32.94)	6.89* (24.06)	5.71* (31.39)
Number on whom complete data available	20	19	21

*$P < 0.05$ **$P < 0.01$ ***$P < 0.001$

A review by Pagnin et al in 2008 selected seven randomized controlled trials with a total number of 245 subjects that were suitable for meta-analysis of ECT versus simulated ECT. The study found a significantly greater effect of ECT as compared with simulated ECT and medication (SSRI, TCA, MAOI)

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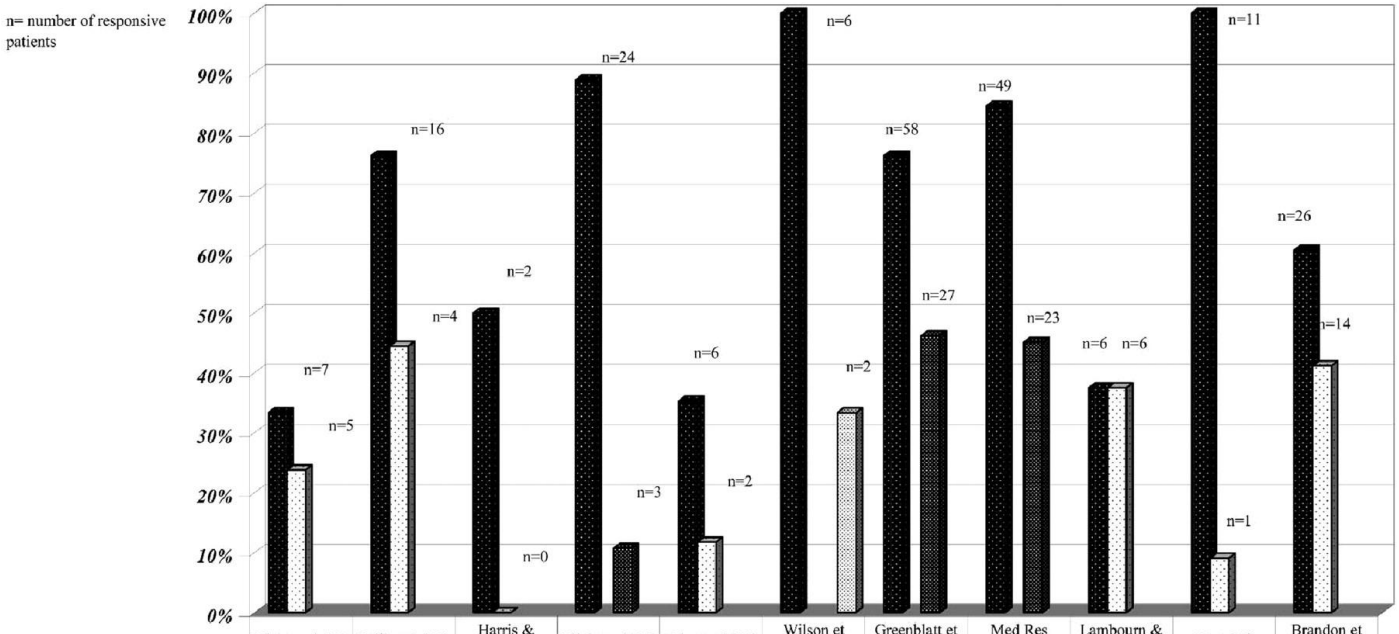

	Ulett et al.(12)	Brill et al.(13)	Harris & Robin(14)	Kiloh et al.(15)	Fahy et al.(16)	Wilson et al.(17)	Greenblatt et al.(18)	Med Res Council(19)	Lambourn & Gill(20)	West(21)	Brandon et al.(22)
ECT	33,33%	76,19%	50,00%	88,88%	35,29%	100,00%	76,19%	84,48%	37,50%	100,00%	60,46%
ECT simulated	23,80%	44,44%	0,00%		11,76%				37,50%	9,09%	41,17%
Placebo				10,71%			46,15%	45,09%			
ECT simulated + Placebo						33,33%					

Does ECT really cause brain damage?

Read et al. has cited ECT as being high risk for permanent memory loss in his paper , [“The effectiveness of electroconvulsive therapy: A literature review”](#) . Dr Cummings' rebuttal to this paper was addressed in his article, “[Should electroconvulsive therapy be banned for schizophrenia?”](#) . Dr Cummings explains the acute adverse effects of ECT related to memory loss during the course of the treatment. ECT does temporarily disrupt the function of the hippocampus, causing memory impairment; however, it is not permanent.

[Meeter et al 2011](#) performed a study looking at memory before, after the ECT series and 3 months after ECT was done. Their first finding was that patients' memory before receiving ECT had worse scores on retrograde amnesia compared to controls, likely because patients that are depressed have impairment to their brain from the depression. They found this correlated highly with pre-ECT anterograde memory function, suggesting a common underlying factor which would be depression. Depression is associated with causing moderate to severe memory deficits in most patients.

Meeter et al concluded, “In conclusion, our results leave open the possibility that ECT as currently practiced does not cause extensive lasting retrograde amnesia, and that the amnesia it does cause is mostly temporary.”

It is also crucial to understand how psychiatric disorders alone can cause severe cognitive effects. Major depressive disorder, as mentioned above, has been associated with significant memory loss and cognitive impairment due to the disruption of metabolic activity in the brain. This is termed pseudodementia, a clinical picture that mimics dementia where patients complain of memory loss. Schizophrenia and bipolar disorder have also been shown to cause severe cognitive impairments.

Other studies worth looking into on Neurocognitive changes:

1. No change:
    a. Obbels, 2018, Long-term neurocognitive functioning after electroconvulsive therapy in patients with late-life depression.
2. Improved global neuropsychiatric performance
    a. Verwijk, 2014, Short- and long-term neurocognitive functioning after electroconvulsive therapy in depressed elderly: a prospective naturalistic study
    b. Verwiji, 2012, Neurocognitive effects after brief pulse and ultrabrief pulse unilateral electroconvulsive therapy for major depression: a review.
3. In regards to dementia, there was decreased risk if > 70 year old, non-significant increased risk if < 70
    a. Osler, 2018, Electroconvulsive therapy and risk of dementia in patients with affective disorders/ a cohort study

ECT is essential for severe mental health illness

Dr. Read mainly focuses on the studies related to depression and ECT. However, in Dr. Cummings article, he states that ECT is important for benzodiazepine non-responsive catatonia, treatment resistant neuroleptic malignant syndrome, treatment resistant mania or mixed mood states, treatment resistant Parkinson's disease, pregnancy where pharmacological agents pose an unacceptable risk, and treatment resistant schizophrenia.

Catatonia is a severe motor syndrome that can include immobility, purposeless activity, strange postures, and mutism. A small group of catatonic patients can also suffer from schizophrenia, while a larger group can also suffer with bipolar disorder. The first-line treatment for catatonia is high dose lorazepam. The efficacy of benzodiazepines is determined by dosage, generally 8-24 mg of lorazepam a day. In a clinical review by Sienaert et al, authors state that patients who are unresponsive to benzodiazepines should start electroconvulsive therapy. They state that in situations of rapid response and severe life-threatening conditions, such as malignant catatonia featuring high idiopathic fevers, tachycardia, and severe blood pressure change, ECT should

definitively be the treatment of choice. Hundreds of case reports have proven to show excellent efficacy of ECT in catatonia. In Lloyd et al., authors state that studies have shown ECT in catatonic patients to report 80-100% high response rates. In cases of lower response rates, it is explained that populations with higher rates of underlying psychotic disorders, delay in appropriate treatment, and/or recent use of dopamine antagonists may be the underlying cause. There is still no standardized, evidence-based approach to the ECT treatment of patients, but a practical and flexible algorithm is suggested.

Combined use of antipsychotics and ECT in treatment-resistant schizophrenia

Dr. Cummings suggests that the addition of ECT to pharmacological therapies has provided a moderate effect size benefit. Clozapine is an atypical antipsychotic often used in the treatment of schizophrenia, specifically for patients that are treatment resistant. Studies have found that 33% of schizophrenic patients are treatment resistant. In Grover et al., authors found that 40-70% of treatment-resistant schizophrenic patients experienced suboptimal responses to clozapine alone (Grover et al., 2015). A meta-analysis by Wang et al., showed that clozapine with ECT compared to clozapine alone had an effect size of 1.44, favoring ECT with clozapine. The augmentation of the drug responses by administering ECT has shown to rapidly improve the patient's symptoms in treatment-resistant schizophrenia. The potential mechanism behind the combined therapy works by ECT first increasing the blood-brain barrier permeability via stimulation, which in turn allows the bigger molecules like clozapine to penetrate the brain easily and cover a greater surface area in the brain. ECT, therefore, amplifies the effectiveness of clozapine.

A retrospective study by Youn et al, compared patients that underwent acute ECT followed by regular ECT for 6 months, classified as M-ECT, to patients that only received acute ECT. They found that M-ECT maintained acute ECT-induced improvements in psychotic symptoms, which could ultimately be lowered to a level similar in patients using clozapine alone during a long-term observation period. Patients that did not continue with ECT sessions found that the psychotic symptoms gradually deteriorated to pre-ECT levels. This is further explained in the Cochrane Review, "Electroconvulsive Therapy for Schizophrenia", which included 26 randomized controlled trials that compared real ECT to a placebo. Authors found that when continuation of ECT was added to antipsychotic drugs, the combination of both was superior to the use of antipsychotics alone (Tharyan et al, 2005). The maintenance ECT was shown to be the most efficacious, especially for patients who desire rapid global improvement and a reduction in symptoms.

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The use of ECT in correctional facilities

The prevalence of mental illness is high in the inmate population; however, there is a lack of data regarding how many patients would benefit from ECT. The prison system contains a high number of people with mental illness because there are no official in-state facilities for psychiatric patients. There are some similarities in forensic psychiatric hospital patients and inmates. In an article called, "The Practice of Electroconvulsive Therapy in US Correctional Facilities: A Nationwide Survey", the authors address a study conducted in Germany where they found that electroconvulsive therapy was indicated in 27 of 774 patients in a general psychiatric hospital, in comparison to 10 of 310 patients in a forensic psychiatric hospital (Surya et al, 2015). Based on that information, it is fair to hypothesize that there are inmates that could benefit from ECT, because of the similarities between inmates with mental health illness and forensic psychiatric patients. There is little data available to understand the need for ECT, and the reasons for limited access have much to do with the stigma of ECT, ethical questions regarding ECT in inmates, and the logistics involved with ECT (Surya et al., 2015).

Conclusion

Despite advances in pharmacotherapy, electroconvulsive therapy remains an essential part of psychiatric treatment of severe mental health disorders, such as treatment-resistant depression and treatment-resistant schizophrenia. Several studies have found that it is effective in a variety of clinical circumstances. The combined therapy of clozapine and ECT has proven to significantly reduce symptoms in treatment-resistant schizophrenics. Patients with catatonia that are resistant to benzodiazepines or suffer from a severe case of catatonia have also benefited from the use of ECT. Studies have shown that ECT can be used as an effective therapeutic tool.

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