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A Shocking Solution: Electroconvulsive Therapy and its Effects on Depression and Other Mental Illnesses

Victoria Cook

Abstract: Mental illness and its treatments continue to be demanding topics requiring the attention of the healthcare community. While pharmaceutical treatments increase in popularity, many people remain unaware of the non-pharmacological options available. One of the available unconventional treatment methods includes electroconvulsive shock therapy, a technique that utilizes bouts of electricity to stimulate anti-depressive behaviors. Although its methods have been disputed for a long time, electroconvulsive shock therapy is a long-standing and effective treatment for depression. Electroconvulsive shock therapy has a dense history which has led to the stigmatization of it as a treatment, and it has credible downsides. Electroconvulsive shock therapy has been proven to work and its use can be promoted via further research on the topic.

Depression is the leading cause of disability worldwide and is recognized as one of the major contributors to the global burden of disease.¹ Historically, society casted the treatment of mental illnesses in a negative light. However, with an increase in the recognition of mental illness as a true obstacle to wellness the stigma surrounding mental illness begins to slowly fade. The focus has shifted away from acknowledgement and towards treatment. Prescription drugs are commonly viewed as the sole agent in combating mental illness. However, there are many other novel therapies posing as potential treatments. One of the most notable therapeutic options is electroconvulsive therapy (ECT), which essentially shocks a patient into good health. While shocking a person into an epileptic episode may appear barbaric and better suited for a low-budget horror film, there has been a surprising number of successful cases where these convulsions alleviate the symptoms of mental illness, particularly depression.² Despite the success of ECT, several less desirable effects merit hesitation.³ Perhaps even more intriguing than the effects of ECT, are the mechanisms by which electricity helps relieve depression. Successful treatments certainly warrant curiosity, but the treatment's scarcity in healthcare is largely unjustified and based on stigma rather than evidence-based results. Overall, ECT deserves more attention both in clinical and research settings within the medical field.

HISTORY

The mistreatment of the mentally ill reached its peak in the 19th century with a surge in the number of mental asylums. Fear of mental illness was spurred on by the growth of populations caused by the Industrial Age and was transformed into the imprisonment of those who suffered from mental illnesses.⁴ Luckily, scientists and other specialists searched for innovative solutions to the conditions now known as schizophrenia and depression. In trials ran by Manfred Sankel in 1927, insulin was used to treat schizophrenia by inducing seizure activity in the patient. Unfortunately, the success did not last, and most

patients returned to their pre-treatment state.⁵ In 1934, metrazol, a drug that caused similar convulsive episodes, was introduced.⁵ These metrazol-induced seizures eventually became the main inspiration behind the first ECT techniques, introduced by Ugo Cerlatti in 1938.² The trials leading up to Cerlatti's established convulsions of the body could improve a patient's mental state, but his new techniques allowed ECT to surpass its predecessors as a suitable treatment.⁵ Metrazol failed to gain traction as a treatment for mental disease due to the lack of instantaneous loss of consciousness which was achieved with Cerlatti's ECT. Within a few successful treatments, Cerlatti's ECT had proved to be a safer and more popular way to improve mental illness than metrazol.⁵ Within months, Cerlatti and his team recognized ECT's ability to alleviate symptoms of depression better than schizophrenia, its targeted illness.² Soon, ECT was on track to become a promising medical treatment for depression.

THE FACTS

Today, ECT is most often used in patients who suffer from major depression with resistance to pharmaceutical drugs. Patients prescribed ECT for depression may also come to the clinic with symptoms of catatonia, a state of immobility; mania, a state of abnormally heightened mood; or lethargy. ECT, introduced to battle depression in the 1930s, is still considered the most successful treatment for severe depression with efficacy rates of 80-90%.^{6,7} Professionals regard the widespread evidence supporting ECT treatment as among the strongest for any medical treatment, due to the large amount of data collected since the first ECT treatment in the 19th century.⁷ ECT is also highly recommended for patients who have recently expressed suicidal thoughts and behavior because it is proven to work quicker than antidepressants.^{6,8}

WHY AND HOW DOES IT WORK?

Although ECT is not a new development in the treatment of mental illness, the mechanisms behind ECT are still unclear. Several theories continue to develop as research advances. Discovering the mechanisms of ECT dates to Sigmund Freud, the first to report a connection between psychological conditions and biological processes in the brain and nervous system. This contrasted with the psychological theory of that time in which mental illness was linked to personality and early childhood experiences.⁵ Many doctors assumed a defective nervous system led to mental illness, which pushed them to research treatments that included electrically stimulating patient brains.⁴ Another key discovery during the early days of ECT was the “biological antagonism” between epilepsy and mental disease, specifically schizophrenia.⁵ Because those suffering from seizures did not typically suffer from mental disease, researchers like Cerlatti induced seizures in patients to cure their mental disease.²

To understand how ECT works, researchers focused on changes in the brain after ECT sessions. Current research indicates an increase in both neurogenesis and cell proliferation in the brain after electroconvulsive seizures.⁶ Neurogenesis is the production of new neurons. This process slows under stress and drug abuse, which are commonly seen in conjunction with depression.⁹ While neurogenesis appears to counteract the effects of stress, recent studies have also indicated increases in neurogenesis after brain trauma.¹⁰ Cell proliferation, or growth, occurs alongside neurogenesis in the same portion of the brain and counteracts depression-like symptoms. Unlike neurogenesis, cell growth drops dramatically after about two weeks post-ECT, aligning with the patient’s relapse back to his or her depressed state. Due to the coincidental timing of patients halting cell growth and returning to their depressed state, researchers propose the effectiveness of ECT in patients with depression and its lack of long-lasting effects are due to the seizure’s stimulation of cell proliferation.⁶

Another theory for the explanation of how ECT works notes how ECT increases levels of glutamate and GABA, two chemicals essential for brain function.⁹ Low levels of glutamate and GABA are typically found in individuals with depression. Therefore, ECT appears to alleviate symptoms of depression by affecting the activity of these two chemicals. Similar to neurogenesis and cell proliferation, increases in glutamate and GABA levels are linked to head trauma. Most people would find the correlation between trauma and ECT alarming, but the processes may serve as recuperative functions for the brain.⁹ The lack of an adopted mechanism of action for ECT necessitates further research.

WHY THE BAD REPUTATION?

With widespread evidence supporting the effectiveness of ECT in treating mental diseases, a person is left to wonder why ECT is a less popular treatment option than the drugs found on

pharmacy shelves. Several reasons exist for the incongruity. To start, ECT’s treatment method is slightly frightening and exacerbated by negative stereotypes portrayed in the media.⁶ To make matters worse, the history of ECT did not proceed in a righteous manner. Psychiatric wards arrived with the growth of cities in the 1900s and were known to sedate unruly patients with a form of ECT. Then in the 1970s, a new wave of protests against the institutionalization of mentally ill patients portrayed both the institutions and ECT treatments in a negative shadow.⁵ While abuse was present in these institutions, the unethical and inappropriate use of ECT treatment should not have dismissed its effectiveness.

Conflicting reports about ECT’s effectiveness have surfaced over the years, but these can be mostly attributed to its inappropriate application. ECT was used for a wide range of mental disorders, even when the patients did not improve.⁶ The overuse of ECT made the treatment appear less effective, further discrediting it. Using electricity to cure a disease may not appear logical or safe, but with the correct application and regulation, it can be effective.

CREDIBLE DOWNSIDES

Similar to prescription drugs used to treat mental illnesses, ECT has notable side effects. One of the major side effects, which has produced the most concern from medical professionals and patients, is the potential for memory loss. In every ECT case, the patient loses consciousness as soon as the first shock is administered.⁶ Then, the patient wakes up after the treatment with slight confusion, a headache, and little recollection of the course of the treatment.⁸ While lack of memory of the actual treatment is an attraction of ECT for many patients,² memory loss can extend as far as six months before the treatment and two months after the treatment.⁸ However, there are techniques to reduce the negative effect on memory. If the procedure is performed with electrodes placed on only one side of the skull rather than on both sides, adverse effects on memory may be prevented.³ Any patient considering ECT should reflect on the potential for memory loss, but also acknowledge the potential side effects in other treatment options, like prescribed antidepressants.

Unlike memory loss, which has proven to be a legitimate concern, other adverse effects of ECT have largely been reduced with proper technique and regulation. In the early days of ECT treatment, fractures and dislocations did occur infrequently,² but these risks have been “virtually eliminated” since the 1980s. Death is another possibility but the chances of death occurring are similar to barbiturate anesthesia use, which is a common technique used within medical practices.⁸

Another common critique of ECT is the high rate of relapse of patients back to their original state. ECT is not a cure. Therefore, when treatments stop, the positive effects typically stop as well. A recent study showed 84% of patients who did not receive any further treatment in the six months after their last ECT session relapsed into their previous state. ECT is not viewed as a long-term treatment and the patient is usually given

antidepressants to prevent relapse, a combination that has proven to be successful. In fact, the same study mentioned earlier revealed only 39% of patients relapsed when the ECT treatment was followed by nortriptyline and lithium. While long-term ECT, or continuation ECT, is another option, the effects of the extended treatment plan require more extensive research.¹¹ In comparison, medications used safely and frequently for extended periods of time also only alleviate symptoms temporarily.¹² Most patients who receive ECT or conventional pharmaceutical treatment for a mental disorder are susceptible to relapse.

CONCLUDING REMARKS

Despite the downsides of ECT and a need for more research, this treatment method can be an incredibly useful tool in the battle against mental diseases. Although society has largely rejected its usage, ECT produces significant beneficial effects in those suffering from depression. In fact, a recent study asked the parents of teenagers who had undergone ECT about their experience and every parent responded positively. Additionally, none of the parents thought ECT was worse than other medications, a stance that opposes popular opinion.¹³ Unfortunately, many health centers do not have a policy for safe ECT practice, thus limiting patient access to ECT.⁶ As depression and other mental diseases gain attention and become less stigmatized, so must their treatments. No matter how uncommon, ECT is a viable treatment option in the healthcare world's repertoire of tools to combat mental illnesses like depression.

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