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RESEARCH

The Story of ECT: Behind the Scenes of a Controversial yet Effective Treatment

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Electroconvulsive therapy (ECT) has been around since the 1930's, yet it is still associated with passionate controversy. A large contributing factor to the current perception of ECT include the negative and grossly inaccurate portrayals in various forms of media. Through a literature review, the mechanisms, safety, efficacy, and side effects of the therapy are presented in a graphic narrative. Using both words and art to present a more accurate and holistic depiction of ECT, it was decided to use this visual medium so that the information could be accessed by a wide range of readers and counter incorrect depictions. In particular, this narrative could be read by individuals who are interested in learning more about ECT or are considering the treatment, allowing this comic to be a tool to help others make informed decisions. The findings from the review suggest that while the mechanism of action has still yet to be elucidated for ECT, it is an effective treatment in certain severe psychiatric illnesses. Specifically, it can improve symptoms and the quality of life of patients, especially for those who may be resistant to pharmacotherapy.

THE STORY OF ECT

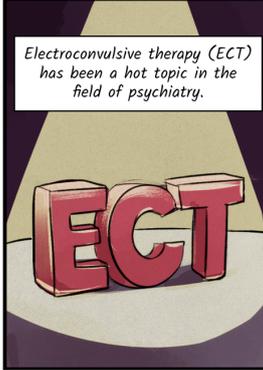
behind the scenes of a controversial yet effective treatment

"IT IS HARD IN FACT TO THINK OF ANYWHERE WHERE THE MISMATCH BETWEEN RHETORIC AND REALITY IS AS GREAT AS IT HAS BEEN IN THE HISTORY OF ECT."

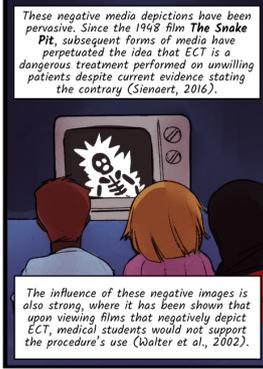
- SHORTER & HEALY, 2007

But what does ECT really look like? And more importantly, what does ECT look like today?

Electroconvulsive therapy (ECT) has been a hot topic in the field of psychiatry.

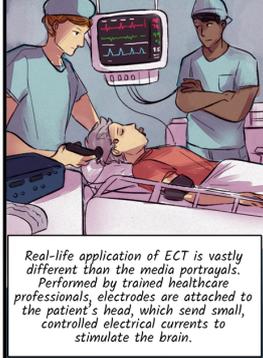


These negative media depictions have been pervasive. Since the 1948 film *The Snake Pit*, subsequent forms of media have perpetuated the idea that ECT is a dangerous treatment performed on unwilling patients despite current evidence stating the contrary (Siennaert, 2016).



The influence of these negative images is also strong, where it has been shown that upon viewing films that negatively depict ECT, medical students would not support the procedure's use (Walter et al., 2002).

Real-life application of ECT is vastly different than the media portrayals. Performed by trained healthcare professionals, electrodes are attached to the patient's head, which send small, controlled electrical currents to stimulate the brain.



One *Flew Over the Cuckoo's Nest* (1975)



ECT depictions in media often illustrate a frightening, inappropriately applied procedure...

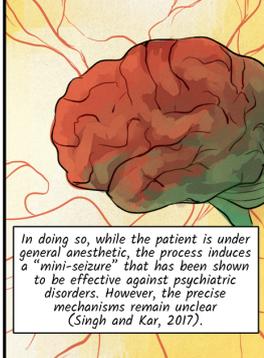


...with dubious benefits (Shorter and Healy, 2007).

Consequently, the lack of accurate information and initial misuse of ECT in its very early days of implementation sparked a resistance movement as part of the anti-psychiatry movement in the 1960s - 1970s (Payne, 2009). In conjunction with negative and inaccurate portrayals of ECT in the media, this has led to apprehension from the general public regarding this procedure.



In doing so, while the patient is under general anesthetic, the process induces a "mini-seizure" that has been shown to be effective against psychiatric disorders. However, the precise mechanisms remain unclear (Singh and Kar, 2017).



MECHANISM

To further elucidate the mechanisms of action, there are a multitude of potential neurobiological pathways to explore. There have been observed differences in brain structure and activity pre- and post-ECT in different areas of the brain; suggesting that these changes might explain observed improvements in symptoms (Takamiya et al., 2018).

Through a review of the current literature surrounding ECT, the mechanism, safety, efficacy, and side effects of ECT will be discussed.

That said, it is undeniable that ECT elicits benefits for various patients, as described in patient's functional and subjective experiences.

In psychiatry, a biopsychosocial model is often considered, where many factors which may cause psychiatric disorders are involved; including biological and environmental elements. Likewise, while effective treatments for psychiatric disorders have been recognized, why and how they work remain outside our scope of knowledge.

Even so, while there isn't one clear mechanism that explains the therapeutic benefits of ECT, studies have explored potential neurobiological mechanisms of actions.

Some hypotheses for these benefits include enhancing neuroplasticity, levels of neurotransmitters, and immune mechanisms. For example, in the brain, the amygdala is a site responsible for regulating emotion, while the hippocampus is involved in memory (Bouckaert et al., 2016).

One proposed mechanism of how ECT improves symptoms is that it may result in an increase in grey matter volumes in these brain regions (Bouckaert et al., 2016). As well, ECT has been implicated in increasing hippocampal functional connectivity in the brain (Singh and Kar, 2017).

For example, glutamate is an excitatory neurotransmitter that is found to be dysregulated in various psychiatric disorders, and it has been suggested that ECT could rectify these imbalances among patients (Pfeiderer et al., 2003).

Increased connectivity within the brain has also been seen after ECT treatment. With ECT, there are increases in neurotransmitters which are associated with forming networks involved in the regulation of attention and mood (Abbott et al., 2014).

These networks within the brain are often affected in individuals with depression; and thus ECT may play a role in upregulating and improving functional connectivity in the brain.

Even so, with all of these potential mechanisms of action in mind, the literature on ECT is still expanding in this area to understand the how and the why.

SAFETY

Nurse
Psychiatrist
Anesthesiologist

In the past, patient injuries (i.e. fractures, injuries to teeth, and muscle damage) after ECT were common, often resembling injuries seen as a result of seizures (Healy and Shorter, 2007). Today, due to the use of proper anesthetic techniques, ECT is much safer and well-tolerated. For instance, muscle relaxants are provided to the patient prior to the procedure to prevent self-injury as a result of the induced "mini-seizure".

ECT is performed by a team of trained healthcare professionals, including psychiatrists, nurses, and anesthesiologists. These members of the healthcare team are all involved in providing the safe application of the procedure.

Furthermore, nowadays, patients are always discharged within the same day as the ECT procedure.

CONSENT

During the application of the procedure, a small current is used to stimulate the brain for a few seconds. At most, a small twitch of the feet is usually the only observable feature of the entire procedure.

The patient is consistently monitored throughout the entire procedure. Oxygen is provided to the patient and vital signs, such as the patient's heart rate and blood pressure, are consistently evaluated.

The mortality rate is believed to be less than 1 out of 98000 treatments, which is comparable to the mortality rate of general anesthesia (Watts et al., 2011). As well, complications typically arise in 1 in 200 patients, and these complications can be defined as occurrences of a transient rise in blood pressure or heart rates outside the range of normal for a brief period of time (Nuttall et al., 2004).

Furthermore, something that is not often addressed in the media, but is an important topic of consideration in any healthcare intervention, is the idea of patient consent.

Often in the media, patients are seen to resist ECT, implying that patients do not have a say as to whether they undergo the procedure. These scenes diminish the importance of consent in making any healthcare decisions, ECT or otherwise (Sienoert, 2016).

In reality, healthcare professionals follow specific guidelines to obtain patient consent prior to the initiation of ECT (Enns, Reiss and Chan, 2010). If a patient has been appropriately evaluated to be incapable of making their own decisions regarding their own health, a substitute decision maker (SDM) may choose for the patient to undergo ECT.

Providing informed consent includes ensuring that the patient or SDM understands the risks and benefits of ECT and alternative treatment(s) as well as has time to ask any questions about their condition and management. Providing informed consent is an ongoing process that occurs throughout the sessions and may be withdrawn at any time. Furthermore, the patient can choose to forego ECT even as they walk into the treatment room (Enns, Reiss and Chan, 2010).

It's important to note that memory loss experienced after ECT is variable among patients, especially in published literature. In one study, it was found that a minority (26%) of patients would report experiencing subjective memory worsening (Bus et al., 2017). Patient-reported memory loss may last for a few weeks during the duration of ECT, but typically resolves with time (Maric et al., 2016).

Therefore, it is often suggested that during the course of ECT, any major decisions that the patient needs to make are postponed, and arrangements are made for someone to help the patient to and from the ECT facility due to the initial experienced confusion (CAMH: Electroconvulsive therapy (ECT), 2018).

As of now, further research is being completed on the extent of memory loss, which patient populations may be more susceptible to it, and methods to reduce its occurrence. Generally speaking, ECT is a safe procedure, in spite of the general public's perceptions or depictions in the media. While the idea of one's memory worsening during the duration of ECT can be concerning, it is important to note that it is typically a self-limiting side effect. In fact, as various psychiatric disorders, such as depression, can impact cognitive function, it is often found that by using ECT as a form of treatment, overall memory and cognition can improve with time (Maric et al., 2016).

With the advent of new neuromodulation devices which stimulate neural activity through different means, new treatment options are also being explored to determine their efficacy in psychiatric conditions such as depression. For example, rTMS (Repetitive Transcranial Magnetic Stimulation) uses magnetic field pulses to stimulate regions of the brain (Brunelin et al., 2007).

DBS (Deep Brain Stimulation) is currently a procedure that has shown a lot of promise in treating disorders such as Parkinson's as well as neuropsychiatric conditions. A "brain pacemaker" is inserted into the brain to stimulate a target in the brain (Mayberg et al., 2005).

Moving into the long-term effects of ECT, one may wonder what is life like for a patient after undergoing ECT. In a meta-analysis investigating patient-reported outcomes after treatment, ECT was found to globally improve patients' health-related quality of life (HRQoL), which included parameters such as physical functioning, bodily pain, social functioning, and mental health (Giacobbe et al., 2018). Therefore, ECT can play an important role in treating and improving patients' functioning.

In general, ECT has undergone unfair scrutiny by the public eye due to its persistent, inaccurate portrayals in the media. Conducted by trained, interprofessional teams, it has great potential in improving patients' acute symptoms and long-term quality of life.

Although there is still much to learn about its mechanisms of action, these questions inspire further investigations into how ECT is able to transform patients' lives for the better.

the end

Keywords: Comics; Electroconvulsive Therapy; ECT; Graphic Narrative; Science Comic

Competing Interests

The authors have no competing interests to declare.

Author's Note

Annie Zhu drew all the images in the comic. All authors contributed to writing the comic.

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