

EDITORIAL: A GLIMPSE AT THE MYTHS LINKED TO ECT

The 1973 film “One flew over the Cuckoo’s Nest”, based on Ken Kesey’s 1962 novel, showed ECT used for the wrong purpose-coercion; for the wrong condition- a character logical problem, and delivered in an unmodified, outmoded fashion without an aesthetic or muscle relaxant.¹ Although the treatment process and indications for use had changed by the time the film was released and have changed more profoundly still since that time, the public has only recently become cognizant of these developments.

Kerr et al² identified four sources from which patients obtain information about ECT in order of frequency: friends, film and television, doctors and print media. They found that people who obtained information from physicians had significantly mistaken beliefs and were less frightened than others, while those whose primary source of information was friends or media were the most fearful. Unfortunately, as Hirschbein and Sarvananda stated, ECT has become a catalyst for the discourse on psychiatry’s putative coercive power and has been utilized by advocates and opponents alike to promulgate their views.³ Popular accounts that portray ECT as coercive or barbaric can obviously interfere with treatment or cause patients to refuse treatment altogether.

ORIGINS OF ECT

Although the specific mechanism of action of ECT has not been isolated, the notion that convulsions may promote wellness has existed for centuries. During the 16th century, the Swiss alchemist Paracelsus gave camphor by mouth to induce convulsions and “cure lunacy.”^{4,5} In 1934, Ladislav Meduna, a Hungarian psychiatrist, investigated a

hypothetical inverse relationship between seizures and schizophrenia. Drawing on neuropathologic studies and a review of work performed over the previous century, Meduna postulated a possible relationship between the lack of glial cells in individuals with Schizophrenia and the overgrowth of these cells in people with epilepsy. Hoping to cure patients with Schizophrenia by inducing epilepsy, he injected camphor in oil into a patient with catatonic schizophrenia, causing a 60 seconds grand mal seizure. The patient went into a full recovery after a short series of such treatments; 5 more patients were treated by the end of the year. Camphor was replaced by metrazol⁵, and the treatment spread throughout Europe.

The concept of applying electricity to the heads of people with mental problems developed as a result of the extremely unpleasant sensations experienced by patients treated with metrazol, which led scientists to seek alternate methods of inducing seizures/convulsions. Swiss scientists developed a method of inducing seizures in dogs using direct electrical current. The Italian scientists Cerletti and Bini subsequently succeeded in defining the parameters necessary for applying electricity directly to the human scalp. In 1938, they treated an unidentified 39 years old man who was found delusional in a train station. His delusions receded after several treatments; he recovered fully after 11 treatments without adverse effects.^{4,6}

MECHANISM OF THERAPEUTIC ACTION

There are no definitive theory regarding the mechanism of action that render ECT effective, although more than 100 theories have

been proposed during the 78 years in which this treatment has been available.

More recent biological theories have highlighted the neurophysiological alterations produced by ECT stimulus, which are likely related to ECT's anticonvulsant effects. The anticonvulsant theory proposes that the self-limiting capacity of ECT seizures and associated functional suppression of bioelectrical activity are associated with efficacy and positive clinical outcome.⁷ ECT's anticonvulsant effects are perhaps most obvious in regard to its use in the clinical treatment of intractable seizure disorders and status epilepticus.⁷ These effects include changes that affect ECT seizure, such as progressive increases in patient's seizure threshold and progressive deterioration in seizure duration, independent of efficacy.⁷

These effects also include increases in inhibitory neurotransmitters and decreases in excitatory neurotransmitters.^{7,8,9}

Brain images, including PET has revealed increases in Cerebral Blood Flow (CBF) AND Cerebral Metabolic Rate (CMR) with the seizure of ECT, producing a hypermetabolic state. However, the ensuing post-ictal (i.e post seizure) state is characterized by decreases in CBF and CMR, indicating functional suppression.^{8,9,10,11}

In addition, scalp recordings of electroencephalographic (EEG) events have also been studied as a measure of cerebral changes and post-ictal bioelectric suppression has been associated with clinical response to ECT. The degree of post-ictal suppression, or decrease in EEG amplitude as well as the development of slow wave (delta) frequencies over the prefrontal cortex during, and after the ECT course, both suggesting reductions in neural activity, have been associated with clinical improvements independent of specific technical aspects of treatment, including electrode placement and stimulus intensity.^{7,11,12}

The intriguing relationship between depression, glucocorticoid levels and memory impairment is relevant for a discussion of ECT's therapeutic as well as cognitive effects. It is known that depression is associated with memory impairment¹³, and disruptions in Hypothalamo Pituitary Axis with resulting elevated glucocorticoid levels^{13,14,15,16,17,18,19} Elevated cortisol is associated with impaired cognitive functioning.^{17,19,20}

ECT IN THE TREATMENT OF SCHIZOPHRENIA

The controversy over the efficacy of ECT for the treatment of Schizophrenia has more recently been embodied in the opposing recommendations of a number of different groups. The recommendations of the American Psychiatric Association²¹ are some of the most positive. They state that "The introduction of effective antipsychotic medications markedly decreased the use of ECT in patients with Schizophrenia. However, ECT remains an important treatment modality, particularly for patients with Schizophrenia who do not respond to pharmacologic treatment." The recommendations provided by National Institute for Clinical Excellence (NICE)²², THE World Federation of Societies for Biological Psychiatry (WFSBD)²³ and the Royal College of Psychiatrists²⁴ in the the United Kingdom were not as sanguine. For example, the most recent NICE Guidelines, published in 2003²² stated:

The evidence for the effectiveness of ECT in Schizophrenia in general was not conclusive and therefore ECT is not recommended for this population. Further research is required to establish clearly the benefits in subgroups of individuals with Schizophrenia, for example, those with severe symptoms of depressive illness or catatonia (pg16).

The WFSBP guidelines, published in 2005, specifically stated that "apart from

catatonia”, ECT should be used in exceptional cases in treatment-refractory schizophrenia, as no advantages have been consistently demonstrated compared to pharmacologic treatments (pg 151)”.²³

Finally, the Royal College of Psychiatrists’ special guidelines on the use of ECT also published in 2005²⁴ stated that “the treatment of choice for acute schizophrenia is antipsychotic drug treatment. ECT may be considered as a 4th line option, that is, for patients with Schizophrenia for whom clozapine has already proven ineffective or intolerable (pg 4). . This publication also reiterates and endorses the NICE guidance in stating that “the current state of the evidence does not allow for general use of ECT in the management of Schizophrenia to be recommended (pg 5). ”

ECT IN THE TREATMENT OF MANIA

The most recent guidance from NICE and the WFSBP guidelines were somewhat more favourable regarding use of ECT in acute and refractory mania than in Schizophrenia.²²

FOR EXAMPLE, NICE GUIDANCE STATES THE FOLLOWING:

“There is less robust RCT evidence (than in depression) to suggest that ECT is effective in the treatment of acute mania and catatonia. However, the committee considered that the data appraised taken in conjunction with the strength of clinical opinion and the experiences of users, provide sufficient basis on which to recommend the use of ECT in restricted circumstances when alternative treatment options have proven ineffective (pg 16).

WFSBP more liberally stated that “ECT is regarded as the most efficacious treatment modality for mania, frequently chosen (and anecdotally found effective) when other approaches have failed.....accordingly, it should be considered in patients accepting this

treatment and who have not responded to previous drug treatments.(pg 10)”.²⁵

The APA guidelines²⁶ reviewed the earlier literature as well as 3 prospective comparative studies and acknowledged that, given the availability and ease of use of both anticonvulsant and pharmacologic agents, ECT has been rather a treatment of last resort for patients who are refractory to medications. They also acknowledged that patients who are medication refractory respond at a lower rate than those for whom ECT is a first line treatment, as is the case with depressive disorders. In sum, although there is a dearth of rigorous research in this area, just as for Schizophrenia, the combination of ECT and antipsychotic medications show promise in promoting speed of recovery and maintaining wellness in the long term. Additional research is warranted, particularly regarding the clinical features of mania that appear to be the most responsive to ECT and the technical features of ECT that appear to be the most effective in treating mania.

ECT IN THE TREATMENT OF DEPRESSION

In the 1960s’, with the introduction of antidepressant medications, the bulk of studies involved comparisons of these new medications to ECT, the standard treatment at that time. Patients were generally randomized to ECT or medication, particularly imipramine, and MAOIs.^{26,27,28}

Although many of these studies would not meet standards for modern clinical trials for various reasons, including antidepressant dosage, non blinded raters, inconsistent response criteria, and diagnostic heterogeneity²⁹, all of these studies found a clear and significant advantage of ECT over medication. In fact, no study has found any treatment, including other forms of brain stimulation currently developed,

to be superior to ECT in the treatment of major depression.³⁰

SIDE EFFECTS: PERCEPTION AND REALITY

The notion that ECT causes brain damage or “fries the brain” has been promulgated since the inception of this treatment. However, there are no data to support this idea or research, in fact, refutes it. For example, in 1994, Devanand et al. published a systematic review of virtually all of the research and general literature regarding this question, reviewing cognitive effects, imaging autopsies on former ECT patients, human epilepsy studies and over 20 animal studies, and found no evidence that ECT produces any damage to the brain on a structural or cellular level.³¹

Special considerations arise in using ECT to treat patients with coexisting medical conditions, particularly certain cardiovascular disorders such as recent MI, congestive heart failure, or valvular heart disease.

Other conditions of concern are neurological disorders such as space occupying lesions or various malformations, diabetes, obstructive pulmonary disease and osteoporosis. Pre-ECT medical evaluation should identify coexisting medical illnesses and evaluate their potential interaction and impact on ECT treatment.

Cognitive Side Effects: 4 types of memory disturbance

Memory disturbances remain the most problematic effect of ECT. Since the introduction of ECT in 1938, patients who have received the treatment have reported cognitive side effects.³²

These effects remain a source of concern. It is important to note here that ECT is known to produce physiologic effects on brain regions which may be integrally involved in short and long term declarative memory. For example, ECT affects memory systems

associated with medial temporal lobe, which contains the hippocampus, implicated in the consolidation of new information (anterograde memory).³³⁻³⁵

A salient finding here is that the duration of the decrease in hippocampal LTP mirrors the duration of amnesic effects following ECT.³⁴

However, medial temporal lobe changes do not explain ECT-related long term (retrograde) memory deficits, which may be associated with physiological changes in the prefrontal cortex caused by ECT.³⁶

Common cognitive side effects fall into 4 basic categories:

- 1) Stereotypical and transient postictal disorientation -that patients experience immediately after ECT treatment, which is a function of the seizure itself and the anaesthesia that was administered. This can range from mild, clearing within minutes to few hours, to severe organic syndromes in rare cases.
- 2) Anterograde amnesia- the inability to retain information learned during and shortly after a course of ECT treatment, which also varies in severity.
- 3) Short term retrograde amnesia- which involves memory gaps for events that occurred within a few weeks or possibly months before the course of ECT. Retrograde amnesia usually improves during the first few months after the acute ECT course, but recovery can be incomplete for some patients.
- 4) Extensive retrograde memory loss- in which the patient experiences severe, persistent memory deficits, dating back to several months or even years.³³

It is ethically, medically and psychologically necessary to provide education and support to both patients and families- before, during and after ECT. The informed

consent process, a legal doctrine introduced worldwide for ECT, provides an initial opportunity for the ECT psychiatrist, and other involved clinicians to impart comprehensive information about ECT, to patients who are capable of comprehending and acting on such information.

Conclusion

How did the concept of using electricity to relieve the suffering associated with certain mental disorders, while generally effective, become so tainted? The fact that ECT is recommended to treat a potentially life threatening condition cannot be overstated, thus it behooves the psychiatric community to help overcome misconceptions within its own ranks and within its own ranks and within the lay public, so that prospective patients can receive the benefit of this underused but effective treatment.

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