Maintenance electroconvulsive therapy: Are we clutching at straws?

Munugapati Christina¹, Abhinav Chichra¹, Dheeraj Kattula¹, Raviteja Innamuri¹, Vishal Akula²

¹Department of Psychiatry, Christian Medical College, Vellore, Tamil Nadu. ²Department of Psychiatry, Institute of Mental Health, Osmania Medical College, Koti, Hyderabad, Telangana, India

ABSTRACT

Introduction: The available treatment options for patients with drug or treatment-resistant psychiatric disorders are limited. Maintenance electroconvulsive therapy (M-ECT) is an established option, but the literature available is limited. This study examined the utilization of M-ECT in a large tertiary care psychiatric facility, and its correlates with the socio-demographic and clinical profile of patients. Methods: A retrospective chart review was performed in a tertiary care psychiatry center based in semi-urban South India, and data was analyzed. Results: A total of 171 patients received ECT in the study period, of which only five patients were on M-ECT. These patients were diagnosed as treatment-resistant and were mostly suffering from schizophrenia. They were located less than 30 km from the hospital. They were on regular treatment but continued to have residual symptoms without functional recovery and required a high level of support from caregivers. Conclusion: Our study supports the effectiveness of M-ECT for the treatment of severe psychiatric disorders and highlights the profile of patients who have received this modality of treatment. It can be suggested with consideration of various psycho-social issues which seem to be related to adherence.

Keywords: Drug resistance, long-term ECT, maintenance electroconvulsive therapy, M-ECT, treatment resistance

Introduction

Scientific advancements in the past few decades have provided us with a better understanding of pathophysiology and treatment of psychiatric disorders. However, these pharmacological and non-pharmacological treatment options may still fail to provide relief to a group of patients because of treatment resistance. Electroconvulsive therapy (ECT) is nearly a century old somatic treatment modality that remains one of the most effective treatment options for drug-resistant and severe psychiatric disorders. Studies report negative attitudes of family physicians toward ECT that may influence the treatment decision of patients and their caregivers. This case series describes cases where ECT has remained as the primary treatment option.

ECT can be used in all phases of treatment.

I. Acute ECT/index ECT (A-ECT) is a course of ECT given at index presentation in order to hasten the remission of symptoms.

II. Continuous ECT (C-ECT) is a course that begins after the index course, lasts up to 6 months, and is designed to prevent relapse of the episode.

III. Maintenance ECT (M-ECT) is a course that begins after the end of C-ECT and is intended to prevent recurrence of an episode.

In certain cases of drug resistance, especially schizophrenia, mania, and depression, M-ECT remains the only option to help to improve the quality of life and to decrease the burden of illness.
The reasons for limited use of M-ECT could be stigma, a poor understanding of ECT among patients and their caregivers, and poor awareness of available evidence among the treating psychiatrists. The literature on M-ECT is scarce, especially in Indian setting. In this retrospective study, we report case summaries of patients who utilized M-ECT in a large tertiary care psychiatric facility.

Methods

This study was conducted in a tertiary care psychiatric facility in South India. Consent from patients or their guardians were taken, and ethics clearance was obtained from the Institutional Review Board. The center is a 122-bedded hospital and has a daily out-patient clinic of about 450–500 patients. It provides short-term care and functions as a tertiary referral center. ECT services are offered to both out-patients and in-patients. ECT sessions are conducted twice a week, where around 10–15 patients receive ECT per day and the number of ECT sessions given per patient ranges from 4 to 12.

The machine in routine use here is the stand-alone NIVIQURE model that delivers bi-phasic brief pulses (bi-directional square waves) and works on the constant current principle at given pre-determined settings throughout the output range. The charge is altered by increasing the train length, keeping other parameters (frequency, pulse width, current intensity) constant.

Records of all patients, across diagnoses, receiving ECT from January 2018 to September 2019 were screened. During this period, about 171 patients received ECT, out of which five patients were found to be on M-ECT and the remaining were on A-ECT. There were no patients on C-ECT. We gathered case and treatment details of the patients from the medical records. All diagnoses were made in accordance with International Classification of Diseases (ICD 10) criteria. The 18 item Brief Psychiatric Rating Scale (BPRS) was used to assess the severity of illness. Mini mental status examination (MMSE) was administered serially to assess cognitive deficits.

Case series

We report a total of five cases who received M-ECT. Table 1 summarizes the socio-demographic details, clinical variables, ECT related details, and functional status of each of the cases.

Case 1

The patient was a 41-year-old single, high-school-educated, currently unemployed male of South Indian origin, with a family history of schizophrenia in first- and third-degree relatives and no medical co-morbidities. He presented with a 25-year history of continuous illness, characterized by florid psychotic symptoms such as delusions of persecution and auditory hallucinations and behavioral disturbances such as spitting on others and self-injurious behavior such as head banging, biting, and severe scratching, with resultant harm to self and others. Hence, he required supervision by his family at all times. On physical examination, there were multiple hypertrophied healed scars on his arm, forearms, and legs.

Treatment history

He was diagnosed as treatment-resistant schizophrenia with obsessive compulsive symptoms. He failed multiple anti-psychotic drugs, including clozapine. He also failed trials of augmentation of clozapine with aripiprazole and amisulpride. He reportedly had a history of good response to ECT and had received two courses of ECT before his index presentation. At the time of considering ECT during this admission, he was on clozapine 700 mg/day in divided doses, inj. zuclopenthixol decanoate 400 mg once in 2 weeks, trihexyphenidyl 2 mg/day, and lorazepam 5 mg/day in divided doses.

Considering previous good response, he was started on ECT for acute control of symptoms. There was worsening of psychotic symptoms on spacing of ECT sessions after 15 ECTS, and hence, it was continued as M-ECT.

Maintenance ECT

At the baseline, the BPRS score was 40. Initially, his seizure threshold was 120 mC with a seizure duration of 63 sec. After five sessions given twice every week, 300 mC was required with a seizure duration of 35 sec, and the BPRS score reduced to 28. Any delay in ECT resulted in worsening of his behavioral disturbances. However, intravenous cannulation was a major problem as most of the cannulation sites were scarred because of his past self-injurious behavior. On two occasions, a jugular line was obtained for administration of anesthesia. As he pulled out the jugular line, ECT had to be discontinued. He had received 32 ECT sessions over 16 months. We continued tab clozapine at 700 mg/day along with depot inj. zuclopenthixol decanoate 400 mg once in 2 weeks during the maintenance phase of treatment.

Outcome

He showed improvement in his biological functions and became independent in activities of daily living with improved self-care. There was a worsening of behavioral disturbances following discontinuation of M-ECT, which was managed with lorazepam PRN doses. However, he was more manageable, although he continued to have residual psychotic symptoms in the form of delusions and hallucinations.

Case 2

A 32-year-old male, graduate and unemployed, had a family history of schizophrenia in multiple first, second-, and third-degree relatives. He had no medical co-morbidities. He presented with a history of continuous illness for 14 years characterized by psychotic symptoms along with episodes of mutism and posturing lasting for 1–2 hours. He was diagnosed as drug-resistant schizophrenia with catatonic symptoms. He had behavioral disturbances and self-injurious behaviors including biting self, secondary to his psychotic symptoms. On physical examination, multiple scars in various stages of healing were found. An electroencephalogram (EEG) was obtained and was normal.
During the acute phase of management, he had good response to A‑ECT (up to 12 sessions). Later, he failed trials of risperidone (up to 8 mg/day) and olanzapine (up to 25 mg/day). He was given a clozapine trial (up to 650 mg/day), with which his psychotic symptoms remitted. He also had overall improvement in functioning, such as self‑care and assisting in household chores. He had recurrence of psychosis after 5 years despite adherence to medication. No other medical or psychosocial contributory factors could be found. He remained symptomatic despite augmentation of clozapine with amisulpride (up to 800 mg/day) and later with haloperidol (up to 15 mg/day). Clonazepam (up to 3 mg/day in divided doses) was continued for catatonic symptoms. Considering limited options and past response to ECT, ECT was restarted again and had good response. Spacing of ECT sessions resulted in severe worsening of psychotic and behavioral symptoms. Hence, M‑ECT was continued along with clozapine (up to 800 mg/day) and haloperidol (up to 15 mg/day).

Maintenance ECT
At the baseline, the BPRS score was 62. Initially, his seizure threshold was 120 mC with a seizure duration of 38 sec. ECT sessions were continued once every fortnight and were gradually reduced to once in 2 months. After 29 ECTs over 31 months, his seizure threshold was 120 mC with a seizure duration of 32 sec. The BPRS score reduced to 28.

Outcome
He continued to have residual psychotic symptoms but showed significant functional improvement with a decrease in assaultive behavior and catatonic symptoms and was independent in self‑care activities.

Table 1: Socio‑demographic details, clinical variables, ECT, and functional status of the cases

| Case 1 | Case 2 | Case 3 | Case 4 | Case 5 |
|--------|--------|--------|--------|--------|
| Age at onset (years) | 16 | 22 | 26 | 19 | 19 |
| Marital status | S | S | M | S | S |
| Diagnosis (ICD 10) | F20.00 | F20.00 | F25 | F20.00 | F20.00 |
| Change in seizure threshold | 180 mC | 180 mC | 180 mC | 240 mC |
| Number of ECTs received | 32 | 29 | 57 | 43 | 36 |
| Duration of M‑ECT (in months) | 16 | 31 | 16 | 14 | 4 |
| Delay in the two successive ECT cycles | Yes | Yes | No | Yes | No |
| Change in rating scale BPRS (%) | 30 | 85 | 25 | 42 | 60 |
| Response to ECT | + | + | + | + | + |
| Current functional status | ADL + | ADL + | ADL + | ADL + | ADL + |
| Current employment status | No | No | No | No | No |

Case 3
A 30-year-old married male, educated up to class 12, self‑employed from a semi-urban background, had a strong family history of serious mental illness in multiple first-degree relatives (three sisters and his mother) and completed suicide in his elder sister. He had medical co-morbidities of systemic hypertension and was on regular anti-hypertensives. He presented with a 5-year history of a continuous but fluctuating course of illness, which was initially diagnosed as paranoid schizophrenia with obsessive compulsive disorder (with predominantly ruminations), was later revised to a severe depressive episode with psychotic symptoms, and later revised to schizoaffective disorder – depressive type. He also had a history of two suicide attempts, which were of high intentionality and lethality.

Treatment history
He failed trials of risperidone (up to 8 mg/day) and aripiprazole (up to 30 mg/day) and later had a partial response to ziprasidone (up to 80 mg/day).

For obsessive-compulsive disorder (OCD) and depressive symptoms, he received failed trials of escitalopram (up to 20 mg/day) and dothiepin (up to 175 mg/day). He later had a good response to clomipramine (up to 250 mg/day).

In view of his suicidal ideation, A‑ECT was initiated, and eight sessions were given with good response. After stopping the A‑ECT, he reported re-emergence of suicidal ideas; hence, ECT was continued as M‑ECT.

Maintenance ECT
At the baseline, the BPRS score was 40. Initially, his seizure threshold was 60 mC with a seizure duration of 48 sec and a
frequency at twice a week. After 57 sessions over 16 months, 240 mC was required with a seizure duration of 26 sec and a frequency of once in 2 weeks. The BPRS score reduced to 25.

Outcome
He maintained well on ziprasidone 80 mg/day, clozapramine 250 mg/day, and clonazepam 0.5 mg in divided dosages and M‑ECT. He had good functional improvement along with the absence of suicidal ideation.

Case 4
A 25-year-old unmarried female from a rural background, who discontinued her BSc Nursing because of her illness, currently unemployed, had a significant family history of intellectual disability in the younger brother and alcohol dependence in her late father. She was born with congenital hearing impairment and speech deficits. She presented with a history of 4 years of a continuous illness characterized by psychotic symptoms and was diagnosed to have paranoid schizophrenia, with a history of deliberate attempt to harm self.

Treatment history
She failed trials of risperidone, trifluoperazine, and chlorpromazine. The quetiapine trial was discontinued because of bilateral pedal edema, and the clozapine trial (given up to 400 mg/day) was discontinued because of neutropenia. She had a good response to A‑ECT and maintained well for 3 months on a pharmacological combination of olanzapine 30 mg/day and chlorpromazine 700 mg/day before she had recurrence of symptoms. As pharmacological options were limited and the family refused consent for re-introduction of clozapine, ECT was re-considered and continued as M‑ECT.

Maintenance ECT
At the baseline, the BPRS score was 70. Initially, her seizure threshold was 30 mC with a seizure duration of 60 sec at a frequency of twice in a week. After 43 sessions over 14 months, the seizure threshold remained as 30 mC with a seizure duration of 25 sec at a frequency of once in a week. The BPRS score reduced to 40.

Outcome
She had residual psychotic symptoms, but functioning improved with better self-care and involvement in household activities.

Case 5
A 20-year-old unmarried female, an undergraduate student, from a semi-urban background had a family history of alcohol dependence syndrome in her late father and dysthymia in her mother. She has medical co-morbidities of dyslipidemia, type 2 diabetes mellitus, and seizure disorder. She presented with a 3-year history of continuous illness of psychotic symptoms and was diagnosed as paranoid schizophrenia, obsessive compulsive disorder (predominantly compulsive acts) with a history of multiple high intentionality, and moderate lethality deliberate attempts to harm self. There were significant behavioral problems of impulsive anger outbursts and self-injurious behavior.

Treatment history
She received failed trials of risperidone (up to 5 mg/day), amisulpride (up to 800 mg/day), and haloperidol (up to 20 mg/day). She showed partial response to aripiprazole (at 30 mg/day) and initial good response to olanzapine (up to 30 mg/day) but with metabolic side effects and amenorrhrea. For OCD, she failed trials of escitalopram (up to 20 mg/day) and fluoxetine (up to 60 mg/day). She had good response with clozapramine (up to 150 mg/day). She needed round-the-clock benzodiazepines for management of agitation. In view of severe suicidal ideation, a high frequency of deliberate attempts to harm self, and inadequate response to pharmacological and non-pharmacological management, ECT was given, and she had good response. Self-harming behavior re-emerged on spacing ECTs and hence was continued as M‑ECT.

Maintenance ECT
At the baseline, the BPRS score was 48. Initially, her seizure threshold was 60 mC with a seizure duration of 55 sec, given at a frequency of twice in a week. After 36 sessions over more than 4 months, she required a seizure threshold of 300 mC, which resulted in a seizure duration of 25 sec. Further spacing of ECTs resulted in severe behavioral disturbances and hence continued at a frequency of twice in a week. The BPRS score reduced to 19.

Outcome
There was significant reduction in disruptive behavior, frequency of anger outbursts, and suicidal ideas.

Discussion
Studies reveal that primary care providers and family physicians have negative attitudes toward ECT.[9] It is often assumed that for patients needing ECT, ECT is used are given for a long period of time as in M‑ECT. However, as shown in our study, of the 171 patients who received ECT over a duration of 12 months, only five patients received M‑ECT.

With regard to the socio-demographic profile of patients, it was found that four out of five patients were single, and the onset of illness is less than 25 years of age. Early onset with a strong family history may often indicate poor prognosis as seen in this case series.[13] Most had a diagnosis of schizophrenia, whereas one had schizoaffective disorder. Psychiatric co-morbidities were noted in almost all the cases, which once again indicate a poor prognosis.[13] Three patients continued to have symptoms even on an adequate dosage of clozapine.[11,14] Two of them received ECT while on clozapine. There was no incidence of tardive seizures[15] or any other complications.[16] They also had suicidal ideation accompanied by severe behavioral symptoms such as self-injurious behavior.[17] Another important parameter in the cases receiving M‑ECT is the distance from the hospital. All cases were living within a 30 km radius and had supportive family members. In all these case records, caregivers reported
significant family burden because of both emotional and financial burden (direct and indirect costs) of M-ECT.

With regard to response, all the cases had good response to A-ECT but poor response to pharmacotherapy along with adverse seizure effects. Interestingly, not all cases had an increase in seizure threshold. All patients had significant worsening in symptoms on spacing successive ECT sessions which lead to consideration of M-ECT. Despite a significant reduction in BPRS scores, all cases had residual symptoms and were unemployed but were functional and independent with activities of day-to-day living. The most common post-ECT complication is the memory deficit. No post-ECT complications were reported in all cases. The MMSE score which was recorded before each ECT was above 28 in all the patients with no major post-ECT cognitive deficits. The reasons for discontinuation are practical difficulties related to M-ECT and were not related to cognitive deficits.

Re-hospitalization rates and frequent out-patient department visits were also considerably reduced after the use of M-ECT. In cases such as these, where the options of treatment are very limited, M-ECT can be helpful.

Limitations
This study is time-bound and has considered only limited cases.

Conclusions
This study concludes that M-ECT is a well-tolerated, effective treatment modality that reduces symptom severity and hospital use for chronic patients who have severe psychiatric illness and are refractory to medication and unmanageable. It could be considered that the use of M-ECT is limited even in current practice and should be considered for patients with limited treatment options, good family support and those living close to the ECT facility.

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Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) or their guardian has/have given his/her/their consent for his/her/their clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Key message
ECT is a life-saving effective modality and in a selected few cases may be the only option of care available.

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Conflicts of interest
There are no conflicts of interest.

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