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(CASE REPORT)

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Maintenance electroconvulsive therapy: An effective yet underused treatment modality in psychiatry: A case series

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Abstract

Maintenance Electroconvulsive Therapy (M-ECT) refers to ECTs administered beyond 6 months after the remission of illness. Maintenance electroconvulsive therapy (M-ECT) can be used to reduce the risk for relapse and recurrence of illness in patients who fare poorly with standard medication regimens. There is improvement in the relapse rate of major psychiatric disorders when continuation or maintenance (C or M-ECT) are used with psychotropics. These are single-center, retrospective case studies of patients diagnosed with major psychiatric disorders (as per International Classification of Diseases, 11th edition) who are receiving M-ECT in Department of Psychiatry, B.J. Government Medical College and Sassoon Hospital, Pune. We included 12 patients- 8 males and 4 females in this study. 4 cases were of patients suffering from schizophrenia, 3 cases were of patients suffering from depression, 1 case of bipolar affective disorder and 4 cases of patients of intellectual disability with psychosis. There was a reduction in hospitalization rate for acute exacerbation and significant improvement in the patients' overall functioning on standardized rating scales without any significant adverse effects. Maintenance ECT is an underused treatment option that can substantially reduce risks of relapse in patients with major depressive disorder, bipolar disorder and schizophrenia as well. Despite the potential value of these ECT schedules, these are relatively neglected in clinical practice. This article aims to explore the clinical utility of maintenance ECTs and emphasizes the use of maintenance ECTs in routine psychiatric care.

Keywords: Maintenance Electroconvulsive Therapy; Schizophrenia; Recurrent Depressive Disorder; Bipolar Affective Disorder; Intellectual Disability with Psychosis.

1. Introduction

Electroconvulsive therapy or ECT is a neurostimulation technique in which an electric current is passed through the brain by applying electrodes on the scalp which induces a generalized tonic-clonic seizure in the patient[1]. It is one of the most effective and safe modality of treatment in psychiatry[2]. Its origin can be found in the 1500s when Paracelsus gave Camphor to patients by mouth to induce seizures and cure psychiatric ailments. Electroconvulsive therapy was first introduced by Cereletti and Bini in 1938 almost 8 decades ago. ECTs have been postulated to work by numerous mechanisms of actions- transient induction of increased proinflammatory cytokines, increased expression of brain derived neurotrophic factor (BDNF), enhanced neurogenesis, synaptogenesis and remodeling of synapses in hippocampus to name a few[3].

An acute course of ECT is given for severe mental illnesses like schizophrenia, bipolar affective disorder, major depressive disorder with suicidal ideations. Continuation ECTs or C-ECTs are the ECTs administered within 6 months of remission, while maintenance ECTs or M-ECTs are ECTs continued beyond 6 months of remission[4]. C-ECTs and M-ECTs are underused and insufficiently studied despite positive clinical experience of more than 80 years[7].

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The American Psychiatric Association task force (2001) has recommended the use of maintenance ECTs for long term management of patients suffering from Major Depressive Disorder, Bipolar disorder and Schizophrenia. Patients to be started on C-ECTs should meet the following criteria[5]:

- History of illness which has shown response to ECTs in the past
- Either the patient prefers maintenance ECTs or has shown a resistance or intolerance to pharmacotherapy
- The ability or willingness of the patient or their appointed representative to receive and give consent for maintenance ECTs and to comply with the overall treatment regime.

The regimen of maintenance ECTs is not clearly defined yet, as there is no evidence supporting any set regimen. However, in many cases it is started on a weekly basis and gradually extended to a monthly basis as per the clinical response[5].

In view of M-ECTs still being such an underused treatment modality in psychiatry we hereby present a case series of 12 patients being administered M-ECTs on outpatient basis in the psychiatric unit of a tertiary care hospital:

- 4 cases of Schizophrenia
- 3 cases of Recurrent Depressive Disorder
- 1 case of Bipolar Affective Disorder
- 4 cases of moderate intellectual disability with psychosis

2. Schizophrenia cases

The clinical information of the cases are mentioned in Table 1. All 4 cases of schizophrenia were diagnosed as per ICD-11 diagnostic criteria of schizophrenia. As per treatment records all cases were that of treatment resistant schizophrenia and were on Tab Clozapine, however the patients still had symptom exacerbation with pharmacotherapy. All the patients had multiple histories of hospital admissions following symptom exacerbation and were administered ECTs during the admissions. Patients showed improvement with the acute course of ECTs and the psychotropics. Since the patients continued having symptom exacerbation on psychotropics these patients were administered maintenance ECTs as per the following schedule:

- 1 ECT every week for about 6 weeks
- 1 ECT every fortnightly for the next 6 weeks
- 1 ECT every monthly thereafter

The patients did not have any symptom exacerbation severe enough to warrant admission since the start of maintenance ECTs with no significant cognitive decline as measured on the MMSE scale. The patients' PANSS scores have also shown a decline since the start of M-ECTs.

Table 1 Clinical Profile of Schizophrenia Cases

Clinical Profile	**Case 1**	**Case 2**	**Case 3**	**Case 4**
Age/ Gender	47 yrs/ Female	31 yrs/ Male	20 yrs / Male	46 yrs / Male
Total duration of illness	10 years	12 years	5 years	30 years
Pharmacotherapy	Tab Clozapine (200mg) Tab Haloperidol (15mg)	Tab Clozapine (200mg) Tab Olanzapine (20mg) Tab Tiapride (200mg)	Tan Clozapine (250mg) Tab Olanzapine (10mg)	Tab Clozapine (200mg) Tab Haloperidol (15mg) Tab Olanzapine (15mg)
Number of M-ECTs received till date	10	42	12	45
PANSS Score at the time of admission	85	87	93	84

PANSS Score at the time of discharge	58	53	45	46
PANSS Score on M-ECTs	55	50	42	45

3. Recurrent depressive disorder cases

The clinical information of the cases are mentioned in Table 2. All 3 cases of recurrent depressive disorder were diagnosed as per ICD-11 diagnostic criteria of recurrent depressive disorder. All these patients had history of multiple hospital admissions for depressive symptoms exacerbation including suicidal ideations each year. The patients were treated with ECTs during their acute phase of admission and reported improvement on ECTs and antidepressants. Patients and their caregivers consented to receive M ECTs in view of multiple exacerbations of illness leading to admissions and additional financial burden on them. The following schedule was used in these patients:

- 1 ECT every week for the first 4 weeks
- 1 ECT every fortnightly for the next 4 weeks
- 1 ECT monthly thereafter

The yearly hospital admissions have decreased thereby improving the quality of life for the patient at the same time decreasing the financial burden of hospital admissions.

Table 2 Clinical Profile of Recurrent depressive disorder cases

Clinical Profile	**Case 1**	**Case 2**	**Case 3**
Age/ Gender	30 yrs/ Female	53 yrs/ Male	27 yrs/ Male
Total duration of illness	5 years	15 years	10 years
Psychotropics	Tab Sertraline (200mg) Tab Lithium (600mg)	Tab Escitalopram (20mg) Tab Clonazepam (0.5mg)	Tb Fluoxetine (60mg) Tb Mirtazapine (30mg) Tb Vortioxetine (25mg) Tb Lithium (600mg)
Hospital admissions on an average in a year before M-ECTs	3-4 per year	4-5 per year	4-5 per year
Hospital admissions on an average in a year after M-ECTs	1-2 per year	0-1 per year	1-2 per year

4. Bipolar affective disorder case

A 29 year old married Marathi speaking male, was brought with complaints of increased energy, over familiarity, increased goal directed activity, decrease need for sleep, all the symptoms being acute in onset. The patient's illness had an episodic course with the current presentation being his fifth episode. He was diagnosed with Bipolar Affective Disorder type 1 in the last 2 years with four episodes in the past despite adherence to medications. The patient had to be admitted for all the 4 episodes and was treated on psychotropics and ECTs.

During the acute phase of management, patient was admitted and continued on Tab Olanzapine (20mg) and Tab Sodium Valproate was increased from 800mg to 1400 mg. In order to manage the patient in the ward and past history of good response to ECTs the patient was given a series of 8 modified ECTs.

Patient's YMRS score at the time of admission was 27/60 which reduced to 11/60 on the day of discharge. Considering the past exacerbations of the patient despite adherence to medications, it was decided to start the patient on maintenance ECTs. He was given maintenance ECT as per the following schedule:

- 1 ECT every week for 1 month
- 1 ECT fortnightly for the next 2 months
- 1 ECT monthly thereafter.

Patient's intensity and frequency of exacerbations reduced following the initiation of maintenance ECTs. The patient has received a total of 14 M-ECTs till date.

5. Moderate intellectual disability with psychosis cases:

The clinical information of the cases are mentioned in Table 3. All 4 cases of intellectual disability were diagnosed as per ICD-11 diagnostic criteria of intellectual disability and IQ assessment. The IQ assessment of all the 4 cases revealed the patients to be cases of Moderate Intellectual Disability. The 4 patients had behavioral disturbances in the form of: Irritability/ Muttering to self/ aggressive behavior/ demanding behavior/ anger outbursts and sleep disturbances. All the patients required multiple hospital admissions for their behavioral disturbances and each admission was treated with antipsychotics and an acute course of 6-8 ECTs. The patients showed improvement in the behavioral disturbances after the acute phase of management however had to be readmitted multiple times in the hospital for their symptom exacerbation despite adherence to psychotropic medications. In order to alleviate caregiver burden to some extent and prevent multiple hospital admissions these patients were started on M-ECTs as per the following regimen:

- 1 ECT every week for the first month
- 1 ECT every fortnightly for the next month
- 1 ECT monthly thereafter

The patients' episodes of aggressive behavior and psychotic symptoms reduced with M-ECTs. One of the patients was also a case of seizure disorder. In addition to helping in behavioral management the ECTs also helped in controlling the seizures episodes in this patient and he has been seizure free for more than 2 years now.

Table 3 Clinical Profile of Moderate intellectual disability with psychosis cases

Clinical Profile	**Case 1**	**Case 2**	**Case 3**	**Case 4**
Age/ Gender	35 yrs/ Female	19 yrs/ Female	35 yrs/ Male	22 yrs/ Male
Total duration of behavioral disturbances	18 yrs	2 years	15 yrs	2 years
Psychotropics	Tab Olanzapine (20mg) Tab Lorazepam (4mg)	Tab Olanzapine (20mg) Tab Tiapride (100mg) Tab Trihexyphenidyl (2mg)	Tab. Clozapine (300mg) Tab Tiapride (200mg) Tab. Clonidine (0.3 mg) Tab Valproate (1400mg)	Tab Risperidone (4mg) Tab Trihexyphenidyl (2mg)
M-ECTs received till date	27	10	9	14
BPRS Score at the time of admission	97	90	95	84
BPRS Score at the time of discharge	57	54	62	55
BPRS Score on M-ECTs	50	48	44	50

Comorbidity	None	None	None	Known case of Seizure disorder since childhood Known case of Bronchial Asthma since childhood

6. Discussion

6.1. Maintenance ECTs in Schizophrenia:

We discussed four cases of patients suffering from schizophrenia who received acute ECTs following exacerbation followed by maintenance ECTs. In these patients, it was observed their PANSS scores reduced with maintenance ECTs along with the number of exacerbations requiring admissions. No significant cognitive decline was observed in these patients as was monitored using the Mini Mental State Examination scale.

One of the studies named 'Maintenance electroconvulsive therapy as an alternative treatment for refractory schizophrenia and schizoaffective disorders was suggested by Levy-Rueff et al. (2010)', was conducted on 19 refractory schizophrenia or schizoaffective patients simultaneously treated with psychotropics and maintenance ECTs. As per this study, the mean yearly hospitalization rates reduced by 80% while also improving the socio-occupational functioning of these patients. In a review of relevant literature, Palinska et al. (2008) concluded that continuation and maintenance of electroconvulsive therapy reduces the risk of schizophrenia relapsing and recurring. It concluded that maintenance ECTs are beneficial for patients who have responded to acute ECTs[5].

Our 4 patients of schizophrenia, who are on maintenance ECTs, have shown similar beneficial results with maintenance ECTs. M-ECTs are still an underused treatment option for patients of schizophrenia. It might not be effective in reducing the core negative features, however it makes the patient's behavior manageable and makes life for their caregivers as well as the patient easier. It improves the social functioning of the patient thereby making their lives tolerable[6].

6.2. Maintenance ECTs in Mood disorders

We highlighted four cases of mood disorders (3 of recurrent depressive disorder and 1 Bipolar affective disorder) where ECT has:

- Reduced number of relapses
- Increased duration between episodes
- Decreased residual symptoms between episodes which further lower risk of relapse
- Reduced burden of psychotropic medications

ECT has also proven beneficial in cases which did not improve on ketamine treatment and also the therapeutic benefits of ECTs remain longer than that of ketamine therapy. Socio-occupational functioning was also improved without significant cognitive decline on standard rating scales[7][8][9].

6.3. Maintenance ECTs in Intellectual Disability with psychosis

4 cases of Intellectual Disability with psychosis were discussed in our paper. All the patients required multiple admissions to control the psychotic symptoms despite adequate behavioral control achieved at the end of the acute phase of management with pharmacotherapy and ECTs as well as adequate pharmacotherapy given after discharge.

Maintenance ECTs markedly reduced their frequency of exacerbations thereby reducing the number of hospitalizations. This helped in slightly improving the quality of life of these patients as well as helped with the caregiver burden both financially as well as emotionally.

As per the limited literature review, Maintenance ECTs in patients of intellectual disability not only helps in long term behavior control but also decreases the number of seizure episodes in patients of antiepileptic resistant seizure disorder. As seizure disorder is a very common comorbidity of patients of intellectual disability, maintenance ECTs in these patients can help serve a dual role, which is worth researching in the future[10][11][12].

7. Conclusions

- **Efficacy across diagnosis:** The cases highlight that maintenance ECTs can be beneficial across a range of psychiatric disorders including Schizophrenia, mood disorders and intellectual disability with psychosis. This underscores the versatility of ECTs as a treatment modality.
- **Individualized treatment approach:** It is crucial to recognise that while maintenance ECTs can be effective, the decision to use it should be individualized based on the patient's clinical presentation, response to previous treatments and preferences.
- **Safety and side-effects:** While maintenance ECTs demonstrated efficacy across the cases presented, it is paramount to address concerns regarding safety, potential cognitive side effects and stigma associated with ECTs. Refinement in the treatment procedure and machines used will be useful to reduce the cognitive side effects with ECTs.
- **Cost- Effectiveness:** Maintenance ECTs are a cost effective measure to prevent exacerbations and frequent relapses leading to multiple hospitalisations of various psychiatric disorders which puts a substantial financial burden on caregivers of these patients.
- **Future Directions:** As we continue to explore the role of maintenance ECTs in psychiatric care, future research should focus on refining protocols, minimizing side effects and enhancing patient and caregiver education. There is a dire need of more research on the topic of maintenance ECTs to bridge the gap of knowledge and to utilize this treatment modality more effectively.

Compliance with Ethical Standards

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Disclosure of conflict of interest

Authors declare that there is no conflict of interest involved**.**

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