IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 23, Issue 9 Ser. 5 (September. 2024), PP 42-46
www.iosrjournals.org

Efficacy And Safety Of Electroconvulsive Therapy (ECT) For Behavioral And Psychological Symptoms Of Dementia (BPSD) In A Peripheral Tertiary Care Hospital: A Prospective Study

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Date of Submission: 05-09-2024 Date of Acceptance: 15-09-2024

I. Introduction:

Behavioral and psychological symptoms of dementia (BPSD), which include agitation, aggression, anxiety, and psychosis, are a common consequence of dementia[1]. BPSD is nearly universal in patients with dementia, where it is correlated with the advanced stage of the illness[2]. Agitation is among the most distressing symptom of dementia, which not only affects patients but also clinicians and caregivers. BPSD is of clinical significance as it is often strongly associated with functional impairment. Therefore, in addition to treating cognitive impairments, targeting BPSD should be considered a priority by mental health providers[3]. Nonpharmacological interventions should be the first line when treating BPSD although many barriers exist in clinical settings to implement such interventions[4]. logical interventions are often required, yet there are no medications approved by the US Food and Drug Administration (FDA) for BPSD due to modest efficacy and tolerability concerns. Further, polypharmacy becomes more common with increasing severity of clinical symptoms. Commonly used medications that are prescribed off-label for BPSD include antipsychotics, antidepressants, mood stabilizers, and cholinesterase inhibitors. Though commonly used, antipsychotics are only modestly effective and are associated with significant side effects, including an FDA-boxed warning for increased mortality[5]. Providers who decide to prescribe antipsychotic medications should evaluate each case thoroughly and carefully, weighing the risk of side effects, and black box warnings. Although antidepressants may have a better risk to benefit ratio, sufficiently powered trials evaluating their safety and efficacy in dementia are still lacking but continue to be an area of research[6]. The evidence regarding mood stabilizers is mixed, where only carbamazepine has been reported to be effective in a few studies and a meta-analysis. The use of mood stabilizers is limited in the clinical setting due to often lengthy side effect profiles, drug-drug interactions, and the need for therapeutic drug monitoring. Cumbo et al. (2014)[7] reported that for patients with mild to moderate dementia, memantine, and rivastigmine may be effective in the improvement of BPSD, without major side effects, but the findings need to be replicated in larger samples. A randomized clinical trial by Cummings et al. (2015)[8] evaluated the effects of dextromethorphan-quinidine on 194 patients with probable Alzheimer's disease. The results of the study showed that this novel treatment modality was efficacious for agitation and was generally well Electroconvulsive therapy has been used worldwide for severe and treatment-resistant psychiatric disorders in elderly patients. Increasing evidence shows that ECT is relatively safe when used among the elderly even though they may be more vulnerable to cognitive side effects and may present with more medical comorbidities[9],[10],[11].

II. Aim And Objectives:

Aim: To study the efficacy and safety of ECT for behavioral and psychological symptoms of dementia (BPSD) in a peripheral tertiary care hospital.

Objectives:
1. To assess the efficacy of ECT in reducing the behavioral and psychological symptoms of dementia (BPSD)
2. To assess the safety and complications of ECT in geriatric patients with BPSD.
3. To compare the efficacy of ECT for different sociodemographic variables.

III. Materials And Methods:

- It was an observational prospective cohort study.
- The study was approved by the institutional ethical committee.
- An informed consent was taken from all the subjects prior to enrolment for the study.
- Sixteen patients were selected based on the following criteria:

1. On admission, the primary psychiatric diagnosis included dementia (any type);
2. The presenting symptoms on admission included behavioral disturbance or agitation associated with dementia.

- Agitation was measured by pre-ECT and post-ECT Pittsburg Agitation Scale (PAS) scores. It assesses four general behavioral groups: Aberrant vocalization, motor agitation, aggressiveness, and resisting care
- Modified ECT with bitemporal electrode placement was administered.
- All patients were continued on their psychotropic medications, but an attempt was made to reduce benzodiazepines to the minimal tolerated dose.
- In addition, lithium, and other anticonvulsants were held the night before ECT treatment to ensure adequate seizures
- A detailed history of the use of psychotropic medications as well as other clinically relevant variables were analyzed.

Statistical analysis:

- Descriptive statistics such as mean, standard deviation, frequency, percentage, and correlation were used.
- MS Excel and Minitab software were used for the collection and interpretation of data.
- Data presentation was done with the help of frequency distribution tables and graphs.
- Paired 't' test and ANOVA for repeated measures were used to analyze the PAS total and subscale scores and number of psychotropic trials, pre- and post-ECT.
- Tests were conducted at a 5% level of significance. P <.05 was considered statistically significant.

IV. Results:

Figure 1: Dementia Diagnosis

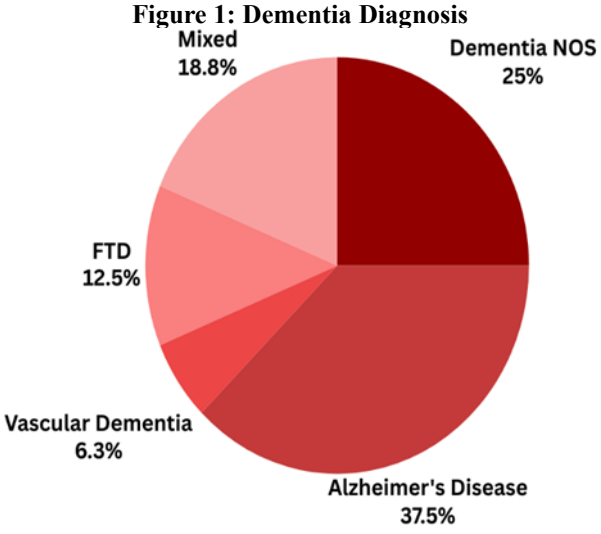
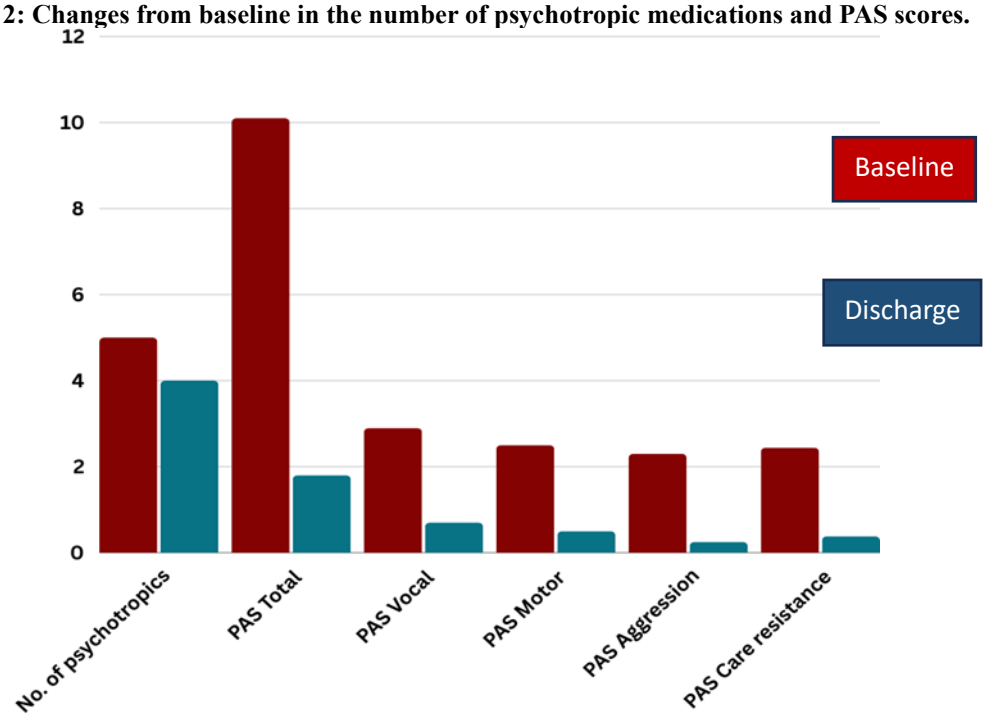


Table 1: Basic data of Patients with Dementia Receiving ECT for Agitation

Characteristics	N = 16	Percentage %
Sex, women	10	62.5
Age (years)	74.5 ± 8.0	-
Socioeconomic status	Lower = 12	66.6
	Middle = 4	33.3
	Upper = 0	00
Length of stay (days)	20.6 ± 3.5	-
Pre- ECT length of stay	6.2 ± 2.1	-
Total number of ECT	6.4 ± 2.3	-
Number of medical comorbidities	5.0 ± 0.8	-
Diagnosis of hypertension (N)	12/16	75.0
Diagnosis of CAD (N)	3/16	18.75
History of heart failure (yes/total)	1/16	6.25
Diagnosis of stroke (yes/total)	1/16	6.25

Figure 2: Changes from baseline in the number of psychotropic medications and PAS scores.



- Sixteen patients (10 women and 16 men, mean age = years) were included in the analysis.
- The average number of medical comorbidities was 5.0 ± 0.8.
- Most did not respond to multiple psychotropic medications (mean number = 5.1±0.8) prior to the ECT referral.
- The baseline PAS total was 10.1 ± 1.4 and it decreased significantly after three ECT treatments (3.5 ± 0.5) and after six (1.8±0.5) ECT treatments (88.5%)
- The number of psychotropic medications at baseline was 5.0 ± 1.6 and it was not uncommon that a patient had been on one or two antipsychotic medications, plus one antidepressant, a mood stabilizer, and one benzodiazepine. At discharge, the number of psychotropic medications was 4.0 ± 0.7 ($p < 0.001$)

Safety and complications:

- Three patients developed postictal agitation (PIA) and mild confusion after their first treatment. These patients were provided with orally dissolving olanzapine 5 mg thirty minutes prior to the subsequent ECT session, which prevented the recurrence of PIA.
- Other than PIA, no other major ECT-related medical complications were observed. One patient developed transient delirium.

Table 2: Comparison of efficacy of ECT for different sociodemographic variables and types of dementia

Variables		PAS- Baseline	Post 6 ECT- PAS
Sex	Female	10.2 ± 1.5	1.9 ± 0.6
	Male	10 ± 1.3	1.7 ± 0.5
Education	Uneducated	10 ± 0.8	1.8 ± 0.6
	Educated	10.3 ± 1.0	1.8 ± 0.4
Socioeconomic status	Lower	10.8 ± 0.8	1.8 ± 0.6
	Middle	10.3 ± 2.6	1.8 ± 0.5
Geographical area	Rural	10 ± 0.8	1.9 ± 0.5
	Urban	11 ± 4.2	1.5 ± o.7
Dementia Diagnosis	Alzheimer's Disease	10 ± 0.6	2 ± 0.6
	FTD	11.5 ± 3.5	2 ± 0.1
	Vascular Dementia	8 ± 0.1	1 ± 0.1
	Mixed	10 ± 0.6	1.6 ± 0.6
	Dementia NOS	9.8 ± 1.0	1.8 ± 0.5

V. Discussion:

- ECT was safe in our sample of patients who had multiple medical conditions, and it appeared to be very effective in reducing agitation and decreasing the number of psychotropic agents prescribed.

- For most patients, significant improvement was observed after three treatments and the median number of treatments was 6.
- Our analysis suggests that ECT may be a safe and effective treatment option for patients with dementia who have refractory BPSD.
- Our findings are consistent with previous reports, Ujkai et al. (2012)[12]. One difference is the overall length of stay in Ujkai's report was significantly longer (59.7 ± 39.7 days) than the one in our sample (20.6 ± 3.5 days).
- Similarly, the number of pre-ECT days in their study (23 ± 15.7 days) was also significantly longer than in our report (6.2 ± 2.1 days), primarily because some of our patients were transferred from another facility and they had been worked up and prepared for ECT.
- ECT shows promise "as an emerging treatment strategy for neuropsychiatric symptoms in dementia[4]."
- However, most clinicians are hesitant to use ECT in patients with dementia, largely due to limited evidence supporting its efficacy and safety.
- Most published studies examining ECT in patients with dementia and agitation or other behavioral problems were either case reports or retrospective chart reviews[13],[14].
- Another concern is that ECT might worsen the already impaired cognitive function of patients.
- This concern has not been supported in well-controlled studies. Some studies have shown that ECT is a safe and efficacious treatment in patients with dementia who have comorbid depression, but this evidence does not address the concern about the risk of cognitive worsening[15],[16].
- Decreasing the days of hospitalization is crucial for this population as longer hospital stays often worsen disabilities in the older population and contribute to medical complications.
- In clinical practice, ECT for agitation in the setting of dementia is not a first-line treatment.
- Prior to ECT, treatment approaches include ruling out medical causes, implementing environmental modifications and behavioral interventions, and also attempting to treat BPSD with psychotropics.
- A reasonable approach would be to attempt less invasive treatment options first but to consider ECT when other options have been exhausted.
- As patients with dementia may lack the capacity to consent to treatment, it is essential to have discussions with family and/or legally authorized representatives to thoroughly address the potential risks and benefits of this modality of treatment.

VI. Limitations:

- There were no measurements of cognitive function before and after ECT treatment. Future studies would benefit from objective measures including the Confusion Assessment Method and Severity Battery Inventory (SIB), a test to evaluate cognition.
- Finally, the role of other factors could also have contributed to the improvement in agitation, such as medication changes, environmental modifications, and behavioral interventions.

VII. Conclusion:

- Acute ECT can be an efficacious treatment for agitation and aggression in dementia patients, leading to improvements in both behavioral and mood symptoms.
- Although postictal confusion was present in the majority of patients, it was transient and well-tolerated in most patients.
- The pathophysiology of agitation and aggression, the mechanism of action of ECT, and our findings of a decrease in the occurrence of both mood and psychotic symptoms following ECT treatment support the hypothesis that the efficacy of ECT for BPSD is related to its antidepressant and antipsychotic properties
- Prospective studies with a control group of patients who refuse ECT would be helpful in determining not only the cognitive side effects of ECT; but also in addressing questions about efficacy, duration of treatment, and timing of ECT treatment intervention.

Conflicts of interest:

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript.

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