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Electroconvulsive therapy combined with antipsychotic therapy in the treatment of acute schizophrenia inpatients: symptom profile of the clinical response

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ABSTRACT

OBJECTIVE: The aim of the study was to examine the efficacy of electroconvulsive therapy (ECT) combined with antipsychotic (AP) medication on symptom profile in patients with a diagnosis of schizophrenia who had received acute psychiatric inpatient treatment.

METHODS: In this prospective study, patients were evaluated for inclusion in the study who were diagnosed with schizophrenia according to DSM-IV diagnostic criteria and were to receive ECT. The patients were evaluated using the Brief Psychiatric Rating Scale (BPRS), Scale for the Assessment of Positive Symptoms (SAPS), Scale for the Assessment of Negative Symptoms (SANS), and Clinical Global Impression – Improvement (CGI-I) sub-scale before the first session ECT, once following every two subsequent sessions and after the final session.

RESULTS: The patients showed significant improvements in BPRS scores at each evaluation compared with their scores at baseline, and a significant clinical improvement was found on the CGI-I sub-scale at the end of treatment. Across all SAPS sub-scores, significant decreases were found, and the symptoms related to hallucinations and positive formal thought disorder showed the most rapid response to treatment. Across all SANS sub-scores, significant decreases were found, and affective flattening or blunting symptoms responded most rapidly to treatment.

CONCLUSION: One of the most important findings in the present study of hospitalized patients with acute schizophrenia was the good response to treatment, which provided significant improvements in both positive and negative symptoms. The most rapid response to treatment was found for hallucinations, positive formal thought disorder, and affective flattening or blunting symptoms. The most important limitation of our study may be the small number of cases. In future, well-standardized studies using a double-blinded, comparative, prospective design and including a sufficient number of patients are needed.

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electroconvulsive therapy;
treatment response

Introduction

Electroconvulsive therapy (ECT) is a somatic treatment method that is based on inducing an epileptic seizure under anaesthesia by using an electrical stimulation. Major depressive disorder, manic episode, schizophrenic exacerbation, and catatonia are the main indications [1,2]. After observing improvements in the clinical presentation of schizophrenic and catatonic patients following spontaneous convulsions, von Meduna hypothesized that schizophrenia and epilepsy antagonize each other, and thus induced the first convulsions in a catatonic patient in 1934 using camphor [3]. Since its use by Cerletti and Bini in 1938, ECT has been recognized as a method for treating schizophrenia [1,2,4].

ECT treatment is administered with different indications for schizophrenic patients hospitalized in psychiatric wards during acute exacerbations. A fast and

effective treatment method in this period is very crucial for diminishing the risks affecting the patients and the medical staff. The most common indications for the administration of ECT in schizophrenia are to increase the effect of antipsychotics (AP) and to control acute symptoms, such as catatonia, aggression, and suicidal behaviour [5,6]. The American Psychiatric Association (APA) recommends ECT in schizophrenia as the first choice for insufficient response to pharmacotherapy or a history of good response to ECT treatment in the past, and as the second choice for resistance to treatment [7]. One-third of patients hospitalized in academic centres in developing countries with a diagnosis of schizophrenia undergo ECT treatment for reasons such as suicidal inclinations, catatonic symptoms, and decreasing the hospitalization period [6,8,9]. There are different reports regarding the rates of effectiveness of ECT applied in combination with AP treatment, varying between 50% and 70% [10].

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ECT combined with AP medication significantly reduced both positive and negative symptoms in acute schizophrenia patients, providing a significant improvement in clinical response. In a retrospective study on the effectiveness of ECT in schizophrenia, Kaster et al. found that three-quarters of patients responded to ECT. They reported a dramatic improvement in symptoms. They emphasized that ECT is an important treatment option for these patients who undergo a great distress as a result of their symptoms [11]. In their meta-analysis, Wang et al. compared treatment-resistant schizophrenia patients who received only AP treatment with those who received combined AP + ECT and they reported better improvement in the group receiving combined treatment [12]. A Cochrane review of ECT in schizophrenia also concluded that ECT is efficacious in the acute and continuous treatment of schizophrenia in combination with antipsychotics [13].

Methods

Patients

We evaluated patients diagnosed with schizophrenia according to the DSM-IV diagnostic criteria who were hospitalized in Bakirkoy Teaching Hospital for Psychiatry, Neurology, and Neurosurgery and for whom ECT was deemed necessary. ECT indications included severe excitation, homicide, and/or suicide risk that did not subside with antipsychotic treatment, as well as resistance to antipsychotic treatment, catatonia, and history of good response to ECT treatment in the past. Patients were invited to participate in this study who were aged 18–65 years, had a minimum educational level of graduation from primary school, did not use alcohol and/or any other substances, and did not have any general medical condition that may preclude administration of ECT.

The patients were informed about the study, and written informed consent was obtained from the patients and/or their relatives/representatives. The study was approved by the local Ethics Committee and was conducted in accordance with the Declaration of Helsinki and Good Clinical Practice.

Concomitant medications

All the patients were taking combinations of psychotropic medications at maximally tolerated doses without clinical improvement; hence, ECT treatment was considered necessary by their attending psychiatrists. Throughout the course of ECT, the patients were treated with a standard antipsychotic regimen (300–600 mg/day chlorpromazine or its equivalent) according to the study protocol.

Assessment and outcome measures

Psychiatric diagnosis and ECT indication were determined by the attending psychiatrist. The sociodemographic and clinical characteristics of the patients were recorded on the sociodemographic and clinical data form. We evaluated psychopathology using the BPRS, SAPS, SANS, and CGI-I before the first ECT (baseline), once following every two subsequent sessions and after the last session.

1. Sociodemographic and Clinical Data Form:

This is a form prepared by the investigators to evaluate the demographic and clinical characteristics of the patients. It contains information about age, educational level, marital status, employment status, duration of illness, number of past hospitalizations, history of past ECT, ECT indication, number of ECT sessions, time between hospitalization and the application of ECT, and days of hospitalization.

2. Brief Psychiatric Rating Scale (BPRS): Developed by Overall et al., this scale measures the severity and evolution of psychotic and some depressive symptoms in schizophrenia and other psychiatric disorders. It is semi-structured and consists of 18 items ranging from 0 to 6 points, and the overall score is calculated by summing the items [14]. The validity and safety of the Turkish version were confirmed by Soykan [15].

3. Scale for the Assessment of Positive Symptoms (SAPS): The SAPS measures the level of positive symptoms in schizophrenia as well as their distribution and the evolution of their severity. It contains 4 sub-scales consisting of hallucinations, delusions, bizarre behaviour, and positive formal thought disorder, with a total of 34 items. Items 1–7 measure symptoms of hallucinations, items 8–20 delusions, items 21–25 bizarre behaviour, and items 26–34 positive formal thought disorder. The highest point total that can be obtained from the scale is 170, with hallucinations assessed on a 35-point scale, delusions on a 65-point scale, bizarre behaviour on a 25-point scale, and positive formal thought disorder on a 45-point scale. The SAPS was developed by Andreasen and adapted for Turkish samples by Erkoc et al. [16,17].

4. Scale for the Assessment of Negative Symptoms (SANS): The SANS was established for measuring the level of negative symptoms observed in schizophrenia as well as their distribution and the evolution of their severity. The SANS is administered by a clinician. It consists of a total of 5 sub-scales and 25 items. These sub-scales are emotional flattening or blunting, anhedonia, alogia, evolution, and lack of attention. Items are scored on six-point Likert scales, with scores varying between 0 and 5 points. The scale is completed based on dialogue with the patient, the observations during the dialogue, and the information obtained from patients' friends and relatives. Higher scores on this scale reflect increased negative symptoms. The

SANS was developed by Andreasen and adapted for Turkish samples by Erkoc et al. [18,19].

5. Clinical Global Impression Scale (CGI): The CGI was developed by Guy et al. (1976) to assess the progress of psychiatric disorders. The scale has three sub-scales demonstrating severity, global improvement, and side effects [20].

ECT procedure

Bi-temporofrontal ECT was administered with a Thymatron IV device at the ECT center of BAKIRKOY three times a week, every other day, in the mornings. The EEG was automatically recorded by the Thymatron IV device. The stimulus dosage was adjusted according to the “half-age method” for determining the initial intensity for starting the bilateral ECT treatment. Seizures shorter than 20 seconds as measured by EEG recordings were considered inadequate, and the stimulation dosage was increased 50%, with a maximum of 3 times per session. In subsequent sessions, when the duration of convulsions decreased to 25–30 seconds, the dosage was increased 10% [21].

Anaesthetic medication

General anaesthesia was induced by propofol (0.75–1 mg/kg), and succinylcholine (0.5 mg/kg) was used as a muscle relaxant. The doses were adjusted according to patients’ needs.

Statistical method

The SPSS for windows 22.0 statistical package programme was used for statistical analysis.

The mean values, standard deviations, medians, minimums, maximums, frequencies, and ratios were used to describe the data. Normality of the distribution

of variables was tested using the Kolmogorov–Simirnov test, and repeated measures analysis of variance (ANOVA) and Wilcoxon tests were used in the analysis of repeated measurements.

Results

A total of 12 male patients were enrolled in the study. One patient left the study after the fourth session after being discharged per the parents’ request. The mean age of the patients in the study was 37.7 ± 9.8 years; the mean level of education was 6.7 ± 2.5 years; and 73% of the patients were single, whereas 82% ($n = 9$) were unemployed. The mean duration of illness was 15.6 ± 9.9 years, and the mean number of past hospitalizations was 3. ECT had been used beforehand in 82% of the cases ($n = 9$). The mean time interval between hospitalization and the application of ECT administration was 6 days. The main indication for ECT was homicidal risk [36% ($n = 4$)] and insufficient response to drug therapy [27% ($n = 3$)]. A total of 78 ECT sessions were conducted on patients, and the average number of ECT sessions was 7. The mean duration of hospitalization was 24.9 ± 6.6 days. The sociodemographic and clinical characteristics of the patients are summarized in Table 1.

When the clinical response to treatment was evaluated, significant decreases were observed in the BPRS, SANS, SAPS, and CGI-I scores.

Changes in symptom severity and clinical response

Brief Psychiatric Rating Scale scores demonstrated a significant decrease ($p < 0.05$) between the baseline and subsequent sessions. The results are summarized in Table 2 and Figure 1.

Table 1. Sociodemographic and clinical characteristics.

		Min.–Max.	Median	Ave. \pm s.d./n-%
Age		20.0–50.0	39.0	37.7 ± 9.8
Education		5–11	5.00	6.7 ± 2.5
Marital status	Married			1 – 9.1%
	Single			8 – 72.7%
	Divorced			2 – 18.2%
	Unemployed			9 – 81.8%
Employment status	Employed			2 – 18.2%
Illness duration (year)		3–34.0	12.0	15.6 ± 9.9
Number of past hospitalizations		1–13	3.00	4.2 ± 3.5
ECT history	None			2 – 18.2%
	Yes			9 – 81.8%
Days between hospitalization and ECT		3–19	6.00	8.3 ± 5.4
ECT indication	Refusal to eat			1 – 9.1%
	Catatonia			1 – 9.1%
	Homicidal risk			4 – 36.4%
	Suicide risk			2 – 18.2%
	No treatment response			3 – 27.3%
	IV			1 – 9.1%
Number of ECT sessions	VI	4–8	7	1 – 9.1%
	VII			4 – 36.4%
	VIII			5 – 45.5%
Days of hospitalization		16.0–40.0	25.0	24.9 ± 6.6

Table 2. Brief Psychiatric Rating Scale.

	Min.–Max.	Median	Ave. \pm s.d.	p ^F	p ^R
<i>Brief Psychiatric Rating Scale</i>					
Baseline	26.0–66.0	53.0	49.7 \pm 13.7		
ECT 2	17.0–52.0	33.0	38.1 \pm 11.9	0.001	
ECT 4	0.0–37.0	26.0	22.9 \pm 10.5	0.000	0.001
ECT 6	7.0–19.0	14.5	13.8 \pm 3.7	0.000	0.018
ECT 7–8	2.0–15.0	6.0	7.3 \pm 4.2	0.000	0.006

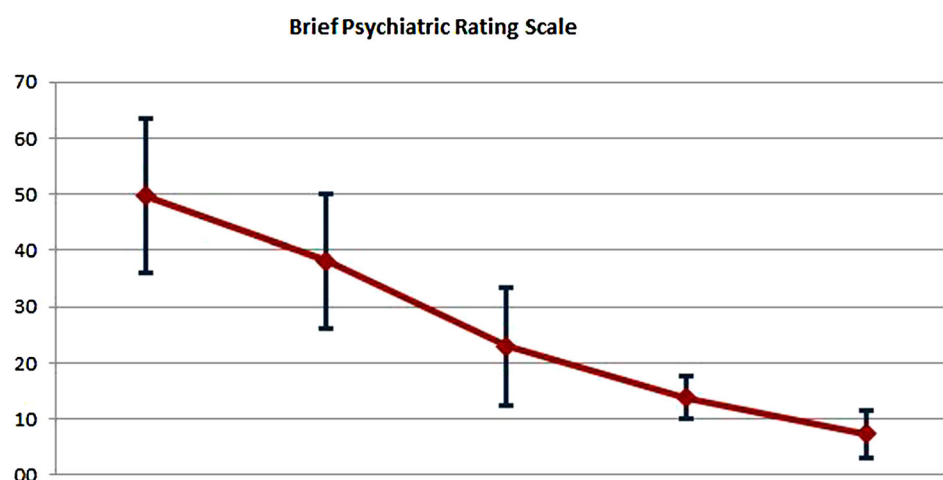
Repeated Measures Analysis of Variance: p^F Changes from the period before ECT/p^R Changes from the previous ECT.

Scale for the Assessment of Positive Symptoms (SAPS): The total scores demonstrated a significant decrease every other session after baseline ($p < 0.05$) compared to the scores at baseline.

Symptom Profile: Across all SAPS sub-scores, significant decreases were found, and the symptom groups that most rapidly responded to treatment were hallucinations and positive formal thought disorder.

Hallucinations: A significant decrease was found in the scores measured every other session after baseline in comparison to baseline. In addition, the decrease between ($p = 0.021$) session 4 and session 2 was also significant.

Delusions: A significant decrease ($p < 0.05$) was found in the scores measured every other session after baseline in comparison to the scores at baseline. In addition, significant decreases were found between

**Figure 1.** Brief Psychiatric Rating Scale (BPRS).**Table 3.** Positive Symptom Rating Scale.

	Min.–Max.	Median	Ave. \pm s.d.	p ^F	p ^R
<i>Positive Symptom Rating Scale Total</i>					
Baseline	19.0–75.0	54.0	46.4 \pm 22.0		
ECT 2	0.0–59.0	26.0	28.5 \pm 17.5	0.000	
ECT 4	0.0–44.0	17.0	19.3 \pm 12.1	0.000	0.011
ECT 6	1.0–17.0	13.5	11.3 \pm 6.3	0.000	0.023
ECT 7–8	0.0–11.0	6.0	4.8 \pm 4.0	0.000	0.006
<i>Hallucinations</i>					
Baseline	0.0–28.0	7.0	11.7 \pm 9.9		
ECT 2	0.0–24.0	3.0	7.1 \pm 8.2	0.012	
ECT 4	0.0–20.0	0.0	3.5 \pm 6.2	0.006	0.021
ECT 6	0.0–8.0	0.0	2.2 \pm 3.3	0.005	0.208
ECT 7–8	0.0–3.0	0.0	0.3 \pm 1.0	0.008	0.108
<i>Delusions</i>					
Baseline	3.0–28.0	16.0	15.6 \pm 7.1		
ECT 2	0.0–20.0	10.0	10.7 \pm 6.1	0.028	
ECT 4	0.0–15.0	9.0	8.5 \pm 4.7	0.001	0.104
ECT 6	1.0–9.0	5.0	4.6 \pm 2.6	0.000	0.036
ECT 7–8	0.0–7.0	0.0	2.0 \pm 2.7	0.000	0.003
<i>Bizarre Behaviour</i>					
Baseline	0.0 \pm 16.0	10.0	9.5 \pm 4.4		
ECT 2	0.0–12.0	5.0	5.0 \pm 2.9	0.006	
ECT 4	0.0–10.0	5.0	4.0 \pm 3.1	0.004	0.408
ECT 6	0.0–6.0	2.0	2.1 \pm 2.1	0.000	0.020
ECT 7–8	0.0–3.0	0.0	0.6 \pm 1.1	0.001	0.062
<i>Positive Formal Thought Disorder</i>					
Baseline	0.0–20.0	11.0	9.5 \pm 7.6		
ECT 2	0.0–11.0	8.0	5.6 \pm 4.7	0.046	
ECT 4	0.0–9.0	4.0	3.3 \pm 3.1	0.015	0.012
ECT 6	0.0–6.0	2.5	2.4 \pm 2.3	0.007	0.139
ECT 7–8	0.0–4.0	0.0	1.2 \pm 1.7	0.003	0.051

Repeated Measures Analysis of Variance: p^F Changes from the period before ECT/p^R Changes from the previous ECT.

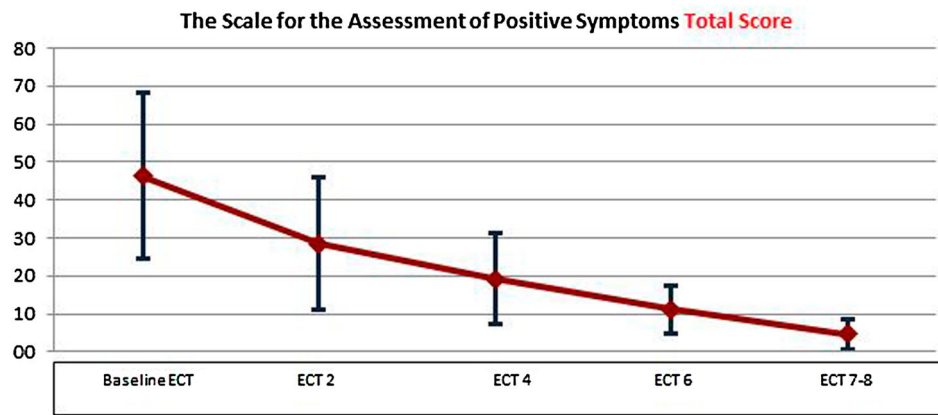


Figure 2. Scale for the Assessment of Positive Symptoms (SAPS).

sessions 4 and 6 ($p = 0.036$) and between session 6 and the final session ($p = 0.003$).

Bizarre Behaviour: A significant decrease ($p < 0.05$) was found in the scores measured every other session after baseline in comparison to the scores at baseline. A significant decrease ($p = 0.020$) was also found between sessions 4 and 6.

Positive Formal Thought Disorder: A significant decrease ($p < 0.05$) was found in the scores measured every other session after baseline in comparison

to the scores at baseline. A significant decrease ($p = 0.012$) was also found between sessions 2 and 4.

The results are summarized in Table 3 and Figure 2.

Scale for the Assessment of Negative Symptoms (SANS): A significant decrease ($p < 0.05$) was found in total scores measured every other session after baseline compared to the scores at baseline.

Symptom Profile: Across all SANS sub-scores, significant decreases were found, and the symptom group that responded most rapidly to treatment was affective flattening or blunting.

Affective Flattening or Blunting: A significant decrease ($p < 0.05$) was found in the scores measured every other session after baseline in comparison to the scores at baseline. A significant decrease ($p = 0.037$) was also found between sessions 2 and 4.

Alogia: A significant decrease ($p < 0.05$) was found in the scores measured every other session after baseline compared to baseline. No significant difference was found between sessions.

Unwillingness-Apathy: A significant decrease ($p < 0.05$) was found in the scores measured every other session after baseline compared to the scores at baseline. The difference between sessions was not significant.

Anhedonia-Asociality: A significant decrease ($p < 0.05$) was found in the scores measured every other session after baseline compared to the scores at baseline. No significant difference was found between sessions.

Attention: A significant decrease ($p < 0.05$) was found starting from session 4 compared to the scores at baseline. No statistically significant difference was found between sessions.

The results are summarized in Table 4 and Figure 3.

Clinical Global Impression Scale-Improvement:

The median value of CGI was 2. A significant decrease ($p < 0.05$) was found in the scores measured every other session after baseline compared to the scores at baseline.

The results are summarized in Table 5 and Figure 4.

Table 4. Negative Symptom Rating Scale.

	Min.-Max.	Median	Ave. \pm s.d.	pF	pR
<i>Negative Symptom Rating Scale Total</i>					
Baseline	24.0–112.0	65.0	63.2 \pm 25.0		
ECT 2	24.0–112.0	38.0	50.0 \pm 25.7	0.008	
ECT 4	0.0–82.0	24.0	30.7 \pm 21.3	0.004	0.030
ECT 6	4.0–46.0	23.0	22.6 \pm 11.9	0.000	0.545
ECT 7–8	3.0–26.0	21.0	18.0 \pm 8.1	0.000	0.157
<i>Affective Flattening or Blunting</i>					
Baseline	9.0–36.0	19.0	21.1 \pm 9.1		
ECT 2	9.0–36.0	13.0	17.3 \pm 9.0	0.017	
ECT 4	0.0–23.0	8.0	8.8 \pm 6.3	0.008	0.037
ECT 6	0.0–14.0	6.5	6.1 \pm 4.4	0.002	0.276
ECT 7–8	0.0–10.0	5.0	4.7 \pm 3.5	0.001	0.401
<i>Alogia</i>					
Baseline	0.0–20.0	10.0	9.0 \pm 7.1		
ECT 2	0.0–20.0	6.0	5.6 \pm 5.7	0.026	
ECT 4	0.0–12.0	3.0	3.0 \pm 3.5	0.022	0.088
ECT 6	0.0–10.0	2.5	2.9 \pm 3.1	0.013	0.719
ECT 7–8	0.0–5.0	1.0	1.9 \pm 2.0	0.014	0.347
<i>Unwillingness-Apathy</i>					
Baseline	2.0–19.0	12.0	10.2 \pm 5.1		
ECT 2	2.0–19.0	6.0	7.9 \pm 4.5	0.020	
ECT 4	0.0–14.0	6.0	5.5 \pm 4.0	0.022	0.081
ECT 6	0.0–8.0	3.0	3.4 \pm 2.4	0.005	0.139
ECT 7–8	0.0–5.0	3.0	2.6 \pm 1.7	0.003	0.081
<i>Anhedonia-Asociality</i>					
Baseline	9.0–25.0	14.0	15.8 \pm 5.6		
ECT 2	7.0–25.0	11.0	13.1 \pm 5.6	0.015	
ECT 4	0.0–24.0	9.0	9.9 \pm 6.6	0.015	0.076
ECT 6	0.0–14.0	6.5	7.2 \pm 4.0	0.001	0.573
ECT 7–8	0.0–10.0	7.0	7.1 \pm 3.2	0.002	0.262
<i>Attention</i>					
Baseline	0.0–13.0	7.0	7.1 \pm 4.7		
ECT 2	0.0–12.0	6.0	6.1 \pm 4.5	0.147	
ECT 4	0.0–9.0	2.0	3.5 \pm 3.5	0.036	0.092
ECT 6	0.0–6.0	2.5	3.0 \pm 2.6	0.030	0.188
ECT 7–8	0.0–3.0	2.0	1.8 \pm 1.4	0.017	0.082

Repeated Measures Analysis of Variance: p^F Changes from the period before ECT/ p^R Changes from the previous ECT.

Table 5. Clinical Global Impression Scale – Improvement.

	Min.–Max.	Median	Ave. \pm s.d.	p ^F	p ^R
Clinical Global Impression Scale – Improvement					
Baseline	0.0–4.0	4.0	3.6 \pm 1.2		
ECT 2	2.0–4.0	3.0	3.3 \pm 0.6	0.004	
ECT 4	0.0–3.0	3.0	2.5 \pm 0.9	0.004	0.081
ECT 6	2.0–3.0	2.0	2.2 \pm 0.4	0.000	0.225
ECT 7–8	2.0–3.0	2.0	2.1 \pm 0.3	0.000	0.347

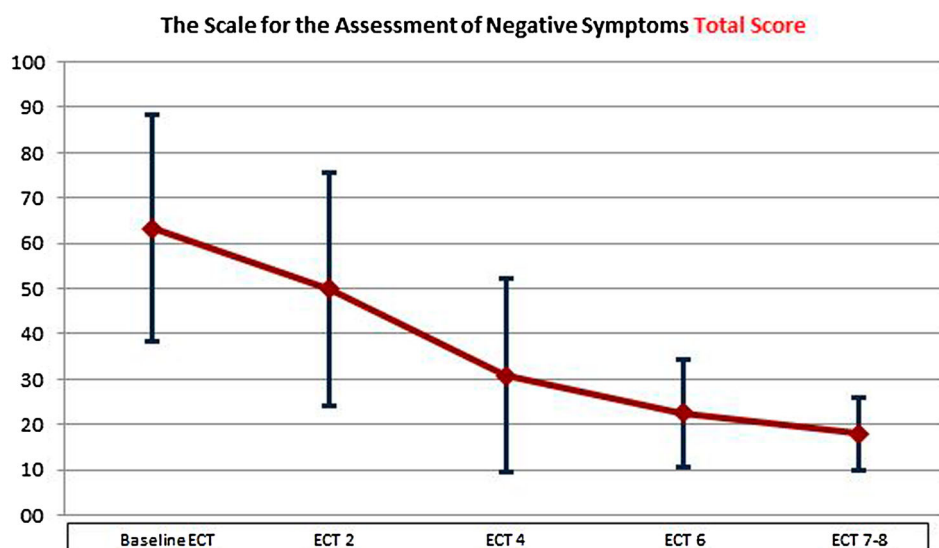
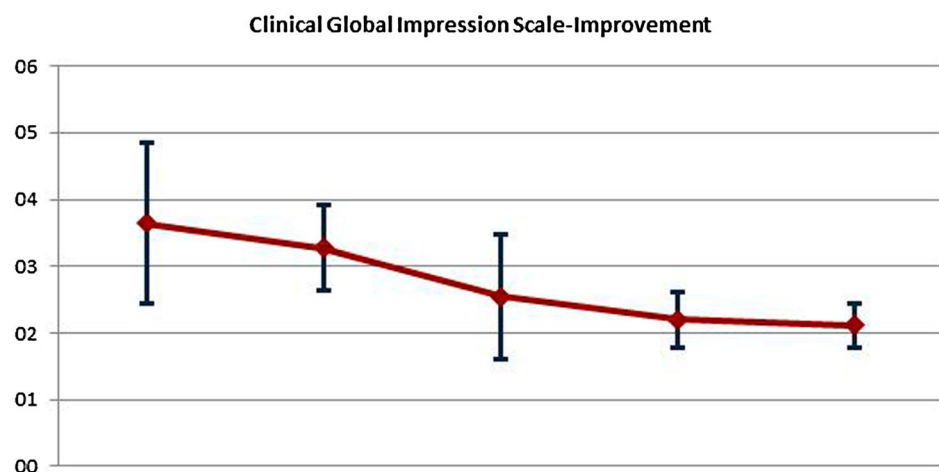
Repeated Measures Analysis of Variance: p^F Changes from the period before ECT/p^R Changes from the previous ECT.

Discussion

We found a significant decrease starting at session 2 in all the rating scales, suggesting that treatment response starts rapidly. A recent review confirms similar results [8]. Studies have shown that combined treatment increases effectiveness by accelerating treatment response. Painuly et al. reported that ECT along with antipsychotic therapy is more effective than antipsychotic therapy alone in the acute phase treatment of schizophrenia. Janakiramaiah et al. reported that

combined treatment accelerates the improvement of acute exacerbations of schizophrenia in treatment-resistant cases [22–24]. These results support our findings, suggesting the possibility of obtaining a rapid and effective response from add-on ECT with AP therapy.

Chanpattana and Sackeim reported that half of the 253 treatment-resistant schizophrenia patients treated with flupenthixol and ECT therapy experienced marked improvement in positive symptoms, with a medium effect on affective symptoms and no effect on or worsening of negative symptoms [25]. In a study on treatment-resistant schizophrenia patients with dominant negative symptoms, Pawelczyk et al. found a significant decrease in symptom severity after AP + ECT [26]. Masoudzadeh and Khalilian divided 18 treatment-resistant schizophrenia patients into 3 groups, one receiving clozapine therapy alone, the second receiving ECT therapy alone, and the third receiving a combination of clozapine and ECT. A significant decrease in PANSS scores and a rapid

**Figure 3.** Scale for the Assessment of Negative Symptoms (SANS).**Figure 4.** Clinical Global Impression Scale (CGI).

response and high cure rate were found for positive and negative symptoms with combined therapy [27]. In SAPS and SANS, we found significant improvement on the total scores starting at session 2. Our findings may indicate that both positive and negative symptoms can be controlled rapidly with AP + ECT.

Among studies on symptom profiles, Zervas et al. reported that the best responses to ECT were found for catatonic, paranoid, and affective symptoms [28]. Thirthalli et al. reported that patients with catatonic schizophrenia had a faster response to ECT [9]. There are studies reporting that ECT is effective for catatonia, anxiety, treatment incompatibilities, auditory hallucinations, persecution delusions, agitation, anorexia, and aggressive behaviour, yet ineffective for somatic complaints and negative symptoms [29]. Johns et al. have stated that ECT improves affective symptoms in schizophrenia patients and has no effect on delusions, hallucinations, and thought disorder [30]. It is remarkable in our study that ECT combined with AP therapy was effective for treating both positive symptoms and negative symptoms in the acute phase. Positive symptoms, such as hallucinations and positive formal thought disorder, and negative symptoms, such as affective flattening or blunting, were the most rapidly improved symptoms. Reports differ regarding the effects of ECT administered in addition to antipsychotic therapy in schizophrenia patients. This difference may be due to differences in sample size, sampling characteristics (gender, race, disease period, etc.), the type of antipsychotic used, and ECT method (such as unilateral or bilateral). Studies on the effectiveness of ECT in schizophrenia were mostly performed with treatment-resistant schizophrenia patients, and the literature on symptom profiles is limited.

We acknowledge the limitations of this study. While we consider our findings encouraging, it must be emphasized that the acute phase response rate observed in this study could have been influenced by its uncontrolled nature. The limitations of this study include its small sample size, inclusion of only males, and administration of only bi-temporofrontal ECT. Well-standardized, double-blinded, comparative, prospective studies with a larger sample size that includes both genders are required. These studies will provide information on how treatment of hospitalized schizophrenia patients can be made faster and more effective.

Conclusion

Our results suggest that ECT combined with antipsychotic pharmacotherapy provides a rapid clinical response in hospitalized patients diagnosed with acute schizophrenia and that this combination is an effective method for treating both positive and negative

symptoms. There are varying reports regarding which symptoms are best treated by combined therapies, and further study is needed to provide answers regarding this issue.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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