EFFICACY OF ELECTROCONVULSIVE THERAPY IN TREATMENT - RESISTANT DEPRESSION

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ABSTRACT

Objective: To evaluate the effectiveness of electro convulsive therapy among patients with treatment resistant depression.

Study Design: Descriptive case series study.

Place and Duration of Study: Study was conducted at AFIMH Rawalpindi, from Apr to Oct 2017.

Patients and Methods: A total of 47 patients with treatment-resistant depression with or without psychotic features of age 18-65 years of either gender were included in the study using non-probability purposive sampling technique. Patients were first diagnosed as per the criteria of International classification of diseases (ICD) version 10 after detailed history and were advised ECT for treatment resistant depression when there was no significant clinical improvement or outcome with two trials of antidepressants from different pharmacological groups along with psychotherapy for at least 6-8 weeks or no clinical response to one or two courses of an anti-depressant/antipsychotic combination in case of psychotic symptoms. The written informed consent was obtained from the patients. They were then assessed by applying the efficacy assessment tool, 21 item Hamilton depression rating scale (HAM-D) before and after 6 sessions (3 weeks) of electroconvulsive therapy.

Results: Mean age in the study was 40.77 ± 11.82 years. Out of the 47 patients, 17 (36.17%) were male and 30 (63.83%) were females with male to female ratio of 1:1.8. Efficacy of electroconvulsive therapy in patients with treatment -resistant depression was found in 39 (82.98%) patients with improvement in score from severe (>20) to mild/normal (<12), whereas there was no efficacy in 08 (17.02%) patients with scoreranging from (15 to >20) on 21-item HAM-D rating scale.

Conclusion: This study concluded that efficacy of electroconvulsive therapy in patients with treatment-resistant depression was overall high in our setting with no major difference found in efficacy with respect to variables like age, gender, and psychosis.

Keywords: Depression, Electroconvulsive therapy, Treatment-resistant.

INTRODUCTION

Depression is known to be treatment resistant when there is no significant clinical improvement or outcome with two trials of antidepressants from different pharmacological groups along with psychotherapy for at least 6-8 weeks. Similarly depression with psychotic features is considered refractory when it does not respond to one or two courses of an anti-depressant/ antipsychotic combination. STAR-D (Sequenced treatment alternatives to relieve depression) trail conducted in 2006 was the largest antidepressant effectiveness study which used remission of depressive symptoms as its main outcome. In 4 subsequent stages different pharmacological agents were used in a trial with overall remission rates found out to be low in patients with long history of recurrent depression. Electroconvulsive therapy was intro-duced in 1938 and has been in use for almost 75 years. It is considered as very effective treatment in severe depression[1]. It involves administration of an electrical current to the brain through the scalp to induce a seizure under general anesthesia and muscle relaxation[2]. Brain seizures to treat psychiatric illness were first induced by camphor and pentylenetetrazol in 1934[3]. In 1938, a neurologist, Ugo Cerletti, used

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electricity to induce a therapeutic seizure in the treatment of a delusional and incoherent patient which showed dramatic clinical improvement. In the 1940s and 1950s it became a mainstay of biological treatment in psychiatry[4]. Evidences from various research reveals that ECT causes significant physiological and chemical changes at molecular level of the brain which accounts for its therapeutic effect[5]. It is a standard treatment in modern psychiatry used mainly when antidepressant medication fails to adequately treat severe depression. It is also indicated where there is a demand for quick symptomatic improvement[6] in individuals with extreme depression, schizophrenia accompanied by catatonia, mania and other affective components[7,8]. With the advent of pharmacotherapy like lithium in mania; chlorpromazine and reserpine in psychosis and imipramine in depression[9] the rate of administration of ECT per admission in UK decreased annually from 35% in 1956 to 2.2% in 1991 and onwards[8]. In USA, similar reductions have been noted as indicated in a new study at Butler Hospital and Bradley Hospital in Rhode Island which shows a sharp decline in the use and availability of ECT in general hospitals across the U.S. The results were published online in the journal biological psychiatry on October 2012[10]. Another survey conducted at US prisons concluded low use of ECT among prisoners with mental illness. It was claimed that it was unethical and unconstitutional not to offer ECT in prison[11]. If the sustainability of ECT is challenged persistently due to associated stigma and poor impression, it may cease to be available to those who would benefit from it[8]. To keep that from happening, evidence for its efficacy is required. Efficacy of ECT had been proven in clinical practice, studies and meta-analyses[2]. A health technology assessment by Greenhalgh et al (2005) combined 3 systematic reviews, which included 2 randomized and 1 non-randomized evidence. A meta-analysis of 18 studies found that ECT in comparison to pharmacotherapy was significantly more effective in depressive illness, as well as cost-effective[8]. Keeping in view its proven clinical effectiveness, the purpose of this study was therefore not only to establish the efficacy of electroconvulsive therapy in patients with treatment-resistant depression in our setting, but also to recognize the contribution of this procedure in the maintenance of mental health at an optimal level, so as to assure its future availability and continuation of beneficial use in other parts of the world.

MATERIAL AND METHODS

This descriptive, case series study was done from Apr 2017 to Oct 2017 on 47 patients with treatment-resistant depression with and without psychotic features. The patients 18-65 years of age of both genders, presenting to the Armed Forces Institute of Mental Health (AFIMH), Rawalpindi were selected for the study using non-probability purposive sampling technique. Sample size of 47 was calculated by using the WHO sample size calculator, keeping 95% confidence level, 85.7% 13 anticipated population proportions and 10% absolute precision. Patients with psychiatric disorders other than depression, and those with cardiovascular, respiratory, and central nervous system diseases which are the relative contra-indications for ECT were excluded. This study was approved by the Ethical Committee of the institute. Patients were diagnosed as per the criteria of International Classification of Diseases (ICD) version 10 after detailed history and

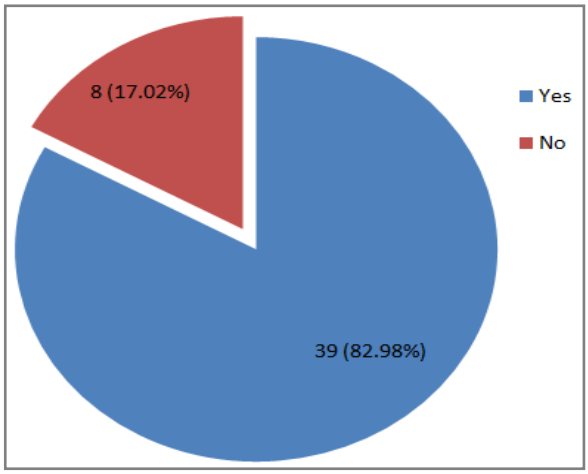

Figure: Efficacy of electroconvulsive therapy in patients with treatment -resistant depression.

were prescribed ECT for treatment resistant depression when there was no significant clinical improvement or outcome with two trials of anti-depressants from different pharmacological groups along with psychotherapy for at least 6-8 weeks or no clinical response to one or two courses of an antidepressant/antipsychotic combination in case of psychotic symptoms. The written informed consent was taken from the participants. They were then assessed by applying the efficacy assessment tool (HAM-D) before and after 6 sessions (3 weeks) of electroconvulsive therapy. ECT was considered effective in these patients if there was significant improvement in treatment-resistant depression with or without psychotic features i.e. a significant improvementin score from range of severe (>20) to mild/ normal (0-12) on 21 item HAM-D rating scale. We used SPSS version 20 for data analysis. Qualitative and quantitative variables were calculated with the help of descriptive statistics. Qualitative variables like gender, marital status, education, employment, psychosis and efficacy were measured as frequencies and percentages. Quantitative variable like age was presented as mean and standard deviation. Fisher's exact test was applied to see significant difference on efficacy among different variable. A *p*-value <0.05 was considered significant

RESULTS

Mean age was 40.77 ± 11.82 years as shown in table-I. Majority of the patients 24 (51.06%) were between 41 to 65 years of age. Distribution of gender and different confounding variables is shown in table-II. Out of the 47 patients, 21 (44.68%) were male and 26 (55.31%) were females with male to female ratio of 1:1.2. Efficacy of electroconvulsive therapy in patients with treatment -resistant depression was found in 39 (82.98%) patientswith score (<12) i.e. significant improvement in score from range of severe (>20) to mild/normal (0-12) on 21 item HAM-D rating scale after 6 sessions of ECT, whereas there was no efficacy in 08 (17.02%) patients with score ranging from (15 to >20) on 21 item HAM-D rating scale,after 6 sessions of ECT (figure). Stratification of efficacy with respect to different variables as shown in table-III. Stratification of efficacy with respect to different variables including age revealed that individuals aged 18-40 years had 78.26% while those aged 41-65 yrs showed 87.5% efficacy. Similarly males had 85.71% while females showed 80.77% efficacy.

Table-I: Age distribution of patients (n=47).

Age (in years)	No. of Patients	Percentage (%) age
18-40	23	48.94
41-65	24	51.06
Total	47	100.0

Mean ± SD = 40.77 ± 11.82 years

Table-II: Distribution of patients with other confounding variables (n=47)

Confounding variables		Frequency	Percentage (%) age
Gender	Male	21	44.68
	Female	26	55.31
Marital status	Married	40	85.11
	Unmarried	07	14.89
Education	Educated	34	72.34
	Uneducated	13	27.66
Employment	Employed	19	40.42
	Unemployed	28	59.57
Psychosis	Yes	31	65.96
	No	16	34.04

Married individuals showed 85% while unmarried individuals showed 71.43% efficacy. Employed individuals showed 89.47% and unemployed individuals showed 78.57% efficacy. Educated individuals showed 85.29% while uneducated showed 76.92% efficacy. Patients with treatment resistant depression with psychotic symptoms showed 83.87% while those without psychotic symptoms showed 81.25% efficacy to electroconvulsive.

DISCUSSION

Electroconvulsive therapy (ECT) is considered by far the most effective treatment for patients with treatment-resistant depression[12]. Recent reports suggest that 70% to 90% of patients with treatment resistant depression responded well to ECT. According to one study in Japan, among 42 patients with treatment resistant depression 23 patients (54.8%) experienced a remission, 13 (30.95%) showed a response to treatment, and 6 (14.28%) did not respond. The overall response rate from ECT which also included complete remission was 85.7%[13] which can be compared with our study results in which overall efficacy of electroconvulsive therapy in such patients was found out to be 82.98%. Another study[14] analyzed the results of 38 patients who had around 6 sessions of ECT. Their current episode of depression lasted for average of 14 months and they spent average of 6 years of their lifetime in depression. They did not respond to almost 5 different pharmacological treatments. Twenty five patient among those which makes (65.8%) showed (improvement HAM-D rating scale scoring of ≥50%) and 21 patients which makes (53.3%) of total number, achieved complete remission i.e. (HAM-D rating scale score ≤10 and improvement in its scoring for ≥60%). Hence the results were consistent with our study results which also showed efficacy in treatment resistant depressed individuals with improvement in their score on HAM-D rating scale from severe (>20) to mild/normal (<12), after 6 sessions of ECT. In one study[15], no significant differences were seen between individuals who responded and those who did not respond with respect to different variables like age, gender, number of previous episodes and whether depression was accompanied by psychotic features. The results of our study, if compared alsoshowed no major difference in efficacy with respect to variables like age, gender, and psychosis. Individuals aged 18-40 years had 78.26% while those aged 41-65 years showed 87.5% efficacy. Males had 85.71%

Table-III: Stratification of efficacy with respect to different variables

Variables		Efficacy		*p*-value
		Yes (n=39)	No (n=8)	
Age (Years)	18-40	18 (78.26%)	05 (21.74%)	0.46
	41-65	21 (87.5%)	03 (12.5%)	
Gender	Male	18 (85.71%)	03 (14.29%)	0.72
	Female	21 (80.77%)	05 (19.23%)	
Marital Status	Married	34 (85.0%)	06 (15.0%)	0.58
	Unmarried	05 (71.43%)	02 (28.57%)	
Employment Status	Employed	17 (89.47%)	02 (10.53%)	0.44
	Unemployed	22 (78.57%)	06 (21.43%)	
Education Status	Educated	29 (85.29%)	05 (14.71%)	0.66
	Uneducated	10 (76.92%)	03 (23.08%)	
Psychosis	Yes	26 (83.87%)	05 (16.13%)	1.0
	No	13 (81.25%)	03 (18.75%)	

Note: Yes (Improvement in score from range of severe (>20) to mild/normal (<12)on 21 item HAM-D rating scale after 6 sessions of ECT). No (Score which remained within the range of (15 to > 20) on 21 item HAM-D rating scale, showing no significant improvement after 6 sessions of ECT)

while females showed 80.77% efficacy. Similarly patients with treatment resistant depression with psychotic symptoms showed 83.87% while those without psychotic symptoms showed 81.25% efficacy to electroconvulsive therapy. A study[16] conducted in Taiwan showed a significant improvement in quality of life of patients after receiving ECT. Ninety five admitted patients diagnosed with depression entered the trial. They were assessed after at least 6 sessions of ECT using different rating tools like 36 item short form survey (SF-36), 17-item hamilton depression rating scale (HAMD-17), and the modified work and social adjustment scale (MWSAS). All the 8 subscales of SF-36 along with HAMD-17, and MWSAS showed a significant reduction in their respective scores after 6 sessions of ECT which proved the clinical efficacy of ECT in treating not only the symptoms of depression but also improving overall functioning[16]. As reported in another study[17], the groups of individuals who received ECT had a greater percentage of those who showed substantial improvement or remission of symptoms (49%) as compared to individuals who received adequate or inadequate antidepressant therapy (27%) or the group of individuals that neither received ECT nor antidepressant therapy (25%). At the end of 7 weeks of hospitalization, 74% of the ECT group had been discharged, significantly more than the adequate antidepressant group which was 54%. It was also reported that patients with psychotic depression responded much more frequently to ECT[17]. A study 18 was conducted to predict the final outcome of the patients with depression depending on early improvement in their symptoms after 3 or 6 sessions of ECT. Patients diagnosed with depressive disorder underwent 12 sessions of ECT and a 17 item Hamilton Depression Rating scale was employed as a tool for the assessment of early improvement or response. Reduction in the HAMD-17 score by at least 20%, 25%, or 30% after 3rd and 6th session of ECT was termed as early improvement, while the reduction in HAMD-17 score of ≤7,60% after 3rd and 6th ECT was termed as response. Among 105 selected patients, 90 (85.7%) were found out to be responders predicting the final good response early on after at least 6 sessions of ECT. Patients who did not show early improvement were unlikely to have response or remission after 12 ECTs[18]. A meta-analysis compared the real ECT with simulated one and revealed that real ECT was significantly more effective (six trials with 256 patients and standardized effect size [SES] -0.91, 95% CI -1.27 to -0.54). ECT was also found to be more effective than pharmacotherapy (18 trials with 1144 participants and standardized effect size -0.80, 95% CI-1.29 to -0.29). Bilateral ECT as compared to unipolar ECT was also found to be more effective (22 trials with 1408 participants and standardized effect size -0.32, 95% C-0.46 to-0.19)[19]. Another study depicted that ECT was significantly more efficacious in the treatment of depression than simulated ECT (9 studies, 321 patients), or pharmacotherapy like antidepressants (14 studies, 1081 patients)[20]. One RCT[21] showed that ECT was better than paroxetine or any two types of antidepressants in the treatment -resistant depression. A meta-analysis by Pagnin *et al*[22] showed that ECT was superior and more effective not only as compared to the simulated ECT and placebo, but also compared to antidepressants in general such as tricyclic antidepressants and monoamine oxidase inhibitors (MAOIs). Similar results were found in the systematic review by Kho *et al*[23] revealed that there is a similarity between sine wave and brief pulse machines. In addition, there was evidence which proved that psychosis responded better to ECT than other treatment options. In a meta-analysis regarding treatment of psychotic depression, Parker *et al* analyzed 24 studies and reported that ECT tends to be more superior as compared to combination therapy with antidepressant and antipsychotic. It was also found more efficacious than the use of antidepressants alone. The guidelines by 2008 British Association for Psychopharmacology which were revised in 2012 also recommended ECT as a first-line treatment for major depression in

emergent situations such as: depressive stupor, high suicidal risk or poor fluid intake. It also recommended that ECT could be considered where patients had relapsed and there was a previous response to ECT or where psychotic features were present[25]. The limitation of our study was the small sample size as the population included in the study comprised of only selected individuals who were depressed and resistant to treatment (pharmacotherapy and psychotherapy). Besides, fewer patients consented to administration of ECT because of stigma related to it. Less duration (6 months) of study was another contributing factor for the small sample size. Therefore the results of this study can't be generalized and there is a need to conduct future studies with larger sample size for an extended duration.

CONCLUSION

This study concluded that efficacy of electroconvulsive therapy in patients with treatment-resistant depression was quite high which in turn accounts for improved functioning and quality of life as well as reduces morbidity and predicts better outcome in such patients. No major difference was found in efficacy with respect to variables like age, gender, and psychosis. Moreover, this study also helped to gain some insight on the subject and would serve as a prelude to conduct future studies for determining its efficacy in general.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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