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Original Article

Diagnostic variability and therapeutic efficacy of ECT in Nepalese sample

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Abstract

Background: Though electroconvulsive therapy (ECT) has been used in Nepal for last twenty years, researches regarding its use, its efficacy and other data are non-existent.

Aims: The objective of this study was to know about diagnostic variability and therapeutic efficacy of the use of ECT in hospitalized patients.

Methods: This is a prospective comparative study between patients who received ECT and who did not using ICD-10 as diagnostic confirmation. Psychopathology was evaluated using Brief Psychiatric Research Scale (BPRS), Hamilton Depression Rating Scale (HAM-D) and Young Mania Rating Scale (YMRS) between the groups at admission, at discharge, at 1st month, at 6th month and at 12th month. Functional assessment of patients was done using Global Assessment of Function (GAF). Modified ECT was performed using general anaesthetic agent.

Results: 47 patients received ECT as compared to 78 patients who were non-receivers. The patients with most common five diagnosis were paranoid schizophrenia (14.4%); psychotic depression (13.6%) ; undifferentiated schizophrenia (8.8%) ; bipolar mania (7.2%) ;severe depression without psychosis (5.6%) . There was significant decrease in BPRS in ECT receiver as compared to non-receivers at discharge (p=0.0001), 1st month (p=0.0001), 6th month (p=0.0001) and 12th month (p=0.0001) ; in YMRS at discharge (p=.008), 1st month (p=.002) and at 12th month (p=.015) ; in HAMD-M at discharge (p=0.0001), at 1st month (p=0.0001), at 6th month (p=0.0001) and at 12th month (p=0.0001) ; in GAF at discharge (p=0.0001), at 6th month (p=0.0001) and at 12th month (p=0.0001).

Conclusion: There was significant improvement in overall psychopathology of patients who received ECT as compared to non-receivers. The improvement was shown by decrement in scores in BPRS, YMRS, HDRS and GAF at the time of discharge, 1st month, 6th month and 12th month which were statistically significant. Day to day functional status of patients also improved as shown by GAF. The efficacy of ECT was very significantly shown in this study with all the psychiatric spectrum disorders.

Key words: ECT, YMRS, HAM-D, BPRS, GAF, Diagnostic variability.

Electroconvulsive therapy (ECT) has been used throughout the world since 1938 despite many pharmaceutical treatment advances. It is the oldest method of somatic treatment, long before chlorpromazine and lithium came. Use of ECT began in Italy in 1938 and soon was used in the rest of Europe and United States before then spreading to developing countries[1]. Despite its high efficacy and very low side effects, it has remained very controversial treatment due to negative publicity, stigmatizations attached to it and lack of awareness even among medical professionals. Due to these reasons, ECT has received low acceptability in the medical community and is one of the most underutilized biological treatments.

ECT has been used in Nepal for more than 20 years but very little details are known regarding its use. Initially ECT use was confined to the only psychiatric hospital in Nepal. Later, its use spread to medical colleges, general hospitals and very few private clinic set-ups. There have been anecdotal reports of abuse of ECT, used indiscriminately and without proper consent by psychiatrists in private clinical setup. But mental hospital and psychiatry departments do follow standard protocol and consent while using ECT. ECT is given either under general anaesthesia or without it depending upon the availability of anaesthetics services. So most of these ECT use have been unmodified in Nepal with very few side-effects and not known mortality reported till now (all are anecdotal reports).

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Current study was done considering these facts in mind and it will also give some glance of efficacy and pattern of ECT use in Nepal because there has been non-existent of researches, report and data of ECT use. So we know nothing about ECT in Nepal. The main objectives of the study were as follows: (1) to find out diagnostic variability of patients receiving ECT. (2) To find out therapeutic efficacy of patients who received ECT. (3) To establish the baseline for ECT use in Nepal.

Materials and methods

This is a naturalistic prospective study done at the Kathmandu Medical College Teaching Hospital (KMCTH). It is one of the medical colleges that lies in the centre of Kathmandu and is affiliated with Kathmandu University (KU). Department of Psychiatry at KMCTH has in-patients, outpatient services along with clinical psychology facility. It has three psychiatrists, one clinical psychologist, one qualified medical doctor and one psychiatry nurse along with other nursing and non-technical staffs. The department has 12 inpatient beds along with psychotherapy room and recreational facility. The current study was done from the in-patient unit of the department. Patients who were admitted from May, 2005 to April 2006 in the hospital beds were considered for study. At that time 210 patients were admitted in the department during that one year period. Of the total patients, 47 patients were considered for the ECT. These patients were compared with 78 patients who did not receive ECT but were in similar diagnostic category. Following indications were considered for the indications for the ECT: (1) Suicidal. (2) Homicidal. (3) Violent patients. (4) Medication resistant. All suicidal attempts/self-harm/suicidal ideations during clinical assessment that considered dangerous by psychiatrists were planned for ECT. Similarly potentially violent patients with history of violence towards other people and family members were also candidates for ECT. Patients who had difficulty in tolerating psychotropic or who had history prolonged response time to medications and side-effects were also considered for the ECT.

Patients with medical co-morbidity (high grade fever, recent cardiovascular diseases, and recent chest infections) and patients who refused to give consent were excluded from giving ECT. Patients and patient's relatives were explained about the ECT procedures, indications, contraindications and side-effects[2]. If patients had not been able to give consent, relative(s) were given informed consent form to sign or fingerprints taken if they were not able to sign. In every ECT session, procedures were explained and consent taken. If the patients and relatives refused or failed to give consent during any sessions, ECT was discontinued in that patient.

Full history and mental state examinations were done after admissions of the patients. Diagnostic assessments were done according to ICD-10 Research Diagnostic Criteria (RDC)[3]. During the hospital admission, patient's psychopathology was assessed by administering Brief Psychiatric Research Scale (BPRS)[4], Hamilton Depression Rating Scale (HAM-D)[5] and Young Mania Rating Scale (YMRS)[6] were used wherever they were needed. Psychopathology were assessed at the time of admission Psychopathology was again assessed at the time of discharge, during the 1st month, 6th month and at the 12th month of the follow up. Patient's day to day functional status was assessed by administering Global Assessment of Function (GAF)[7] at the time of admission, at discharge, 6th month and at the 12th month year of the follow up. Psychopathology and GAF were assessed on ECT receivers (n=47) and ECT non-receivers (n=78) and comparison was made between them. ECT was done twice a week or sometimes more than that depending upon the urgency of the situation. ECT was phased out after there is more than 50% of clinical improvement, psychopathological assessment done using BPRS, YMRS and HAM-D Only admitted patients were taken for the ECT because pre-anaesthetic assessment was necessary a day prior to procedure from the anaesthesia department. Patients were evaluated and necessary investigations were done to rule out other medical conditions. Patients were put on nil per orally 7 hours prior to taking patients to Operation Theatre. ECT was done under general anaesthesia using inducing agents such as Propofol (2 mg/kg) or Sodium Thiopental (5 mg/kg). Succinylcholine (2 mg/kg) was used along with above mentioned agents. Masked ventilation was done using 100% oxygen and vitals signs were monitored along with ECG throughout the procedure. One of the arms was spared with B.P. cuff before administrating muscle relaxant so that adequate convulsing can be seen during ECT. At least 15 seconds of convulsion was considered as an effective convulsion though it varies from 10 seconds to 120 seconds depending upon the dose of anaesthetic agents and clamping of BP cuff. Upward titration of electrical dose was done according to clinical improvement of the patients. Patients were shifted to post-operative ward after they become conscious, they were kept there for at least 2 hours and shifted to psychiatric ward.

Patients were divided in to two groups- those who received ECT (n=47) as ECT Receivers and those who did not received ECT (n=78) as Non-receivers. Socio-demographic and clinical data were recorded on pre-designed performa which included psychopathological assessment at different point of time along with GAF. The collected data were checked and coded manually and entered in the computer. Statistical analysis was performed with SPSS program (version 12). Data interpretation was done along with mean, standard deviation. Chi-Square Test was used for assessing the statistical significance of the associations between the variables.

The ECT machine

The machine used for administering ECT was ECTON constant current and brief pulse ECT which has been manufactured by RMS, Chandigarh, India. This machine has of two types of operations – Brief Pulse Mode 1(PLS1); Brief Pulse Mode 2 (PLS2); The Sine Wave. Almost all of the procedure used in this study was done using PLS-1 to maintain uniformity in the procedure.

Results

There were 47 patients who received ECT (mentioned as ECT receivers) compared with 78 patients who did not received ECT (mentioned as non-receivers).These two groups of patients were compared in socio-demographic profile (age and sex) as shown in Table 1. Table 2 shows components of ECT machine (frequency, pulse width, duration of current, current) along with total duration of tonic-clonic convulsion and number of ECT treatment done in patients. In this study, an average duration of tonic-clonic convulsion was 23.57 seconds, minimum being 16 seconds and maximum being 43 seconds. Duration and quality of convulsion is necessary to monitor clinical progress and to prevent possible prolonged seizure (120-180 seconds)[8,9]. The mean number of ECT treatment was 5.85, from minimum 2 to maximum 16.The average ECT frequency was 70.50 Hz, pulse width 1.75 msecs, duration 1.779 seconds and current 723 amperes. Patients were compared in diagnostic variability in Table 3 between ECT receivers and non-receivers. ICD-10 Research Diagnostic Criteria[2] was used to assess and diagnose patients. Changes in psychopathological measurements were done. Patients receiving diagnosis of schizophrenia, acute psychotic episode and bipolar mania were assessed with BPRS (Table 4) whereas HAM-D was used in patients with diagnosis of depressive episode and bipolar depression (Table 5). YMRS was used in patients with diagnosis of bipolar disorder, currently mania/mixed (Table 6). All these psychopathological measures were done at admission, discharge, 1st month, 6th month and at 12th month. Patient's day to day functional status was measured by GAF at admission, discharge, and 6th month and at 12th month (Fig 1).

Table 1: Socio-demographic Characteristics of Patients (sex and age)

		ECT Receivers vs. Non-receivers		Total
		ECT non-receivers	ECT receivers	
Sex	Male	46(57.5%)	34(42.5%)	80(100%)
	Female	32(71.1%)	13(28.9%)	45(100%)
Total		78(62.4%)	47(37.6%)	125(100%)
Age	10-19	3(2.4%)	5(4%)	8(6.4%)
	20-29	44(35.2%)	27(21.6%)	71(56.8%)
	30-39	24(19.2%)	9(7.2%)	33(26.4%)
	40-49	3(2.4%)	3(2.4%)	6(4.8%)
	50-59	3(2.4%)	3(2.4%)	6(4.8%)
	70-79	1(0.8%)	0	1

Table 2: Details of ECT (ECTON ECT Machine)

ECT receivers (n=47)	No. of ECT	Frequency (Hz)	Pulse width(PW) (msec)	Duration of current (seconds)	Current (amperes)	Duration of convulsion (seconds)
Mean	5.85	70.50	1.7561	1.779	723.00	23.57
Range	14	35	.80	.8	250	27
Minimum	2	50	1.20	1.3	550	16
Maximum	16	85	2.00	2.0	800	43

Table 3: Diagnostic variability of patients (Based on ICD-10, RDC)

Psychiatric Diagnosis according to ICD-10)	ECT non-receivers	ECT receivers	Total
F20.0 (paranoid schizophrenia)	9 (7.2%)	9 (7.2%)	18 (14.1%)
F32.2 (severe depression with psychosis)	9 (7.2%)	8 (6.4%)	17 (13.6%)
F20.3 (undifferentiated schizophrenia)	6 (4.8%)	5 (4%)	11 (8.8%)
F31.2 (bipolar mania without psychosis)	4 (3.2%)	5 (4%)	9 (7.2%)
F32.3 (severe depression with psychosis)	4 (3.2%)	3 (2.4%)	7 (5.6%)
F31.5 (bipolar disorder, severe depression with psychosis)	3 (2.4%)	3 (2.4%)	6 (4.8%)
F30.2 (mania with psychosis)	2 (1.6%)	3 (2.4%)	5 (4%)
F20.2 (catatonic schizophrenia)	2 (1.6%)	2 (1.6%)	4 (3.2%)
F23.0 (acute psychosis with symptoms of schizophrenia)	4 (3.2%)	0 (0 %)	4 (3.2%)
F31.6 (bipolar disorder, current mixed)	1 (.8%)	2 (1.6%)	3 (2.4%)
Others	34 (27.2%)	7 (5.6%)	41 (32.8%)
Total	78 (62.4%)	47 (37.6%)	125 (100%)

Table 4: Comparative scores, means and p values of Brief Psychiatric Research Scale (BPRS) between ECT non-receivers and receivers at admission, discharge, 1st month, 6th month and 12th month [F20.0; F32.2; F20.3; F32.3; F20.2; F23.0 AND OTHERS]

ECT Receivers vs. Non-receivers		BPRS at admission	BPRS at discharge	BPRS 1 month later	BPRS 6 months later	BPRS 12 months later
ECT non-receivers	Mean	76.34	47.62	38.66	32.43	26.91
	N	65	65	65	65	65
	Std. Deviation	8.586	4.977	4.484	3.957	3.512
ECT receivers	Mean	79.37	38.60	30.13	27.08	22.85
	N	40	40	40	40	40
	Std. Deviation	8.369	5.692	5.594	8.541	3.017
Total	Mean	77.50	44.18	35.41	30.39	25.36
	N	105	105	105	105	105
	Std. Deviation	8.592	6.837	6.439	6.619	3.863
Statistical significance(p value)		0.079	0.0001	0.0001	0.0001	0.0001

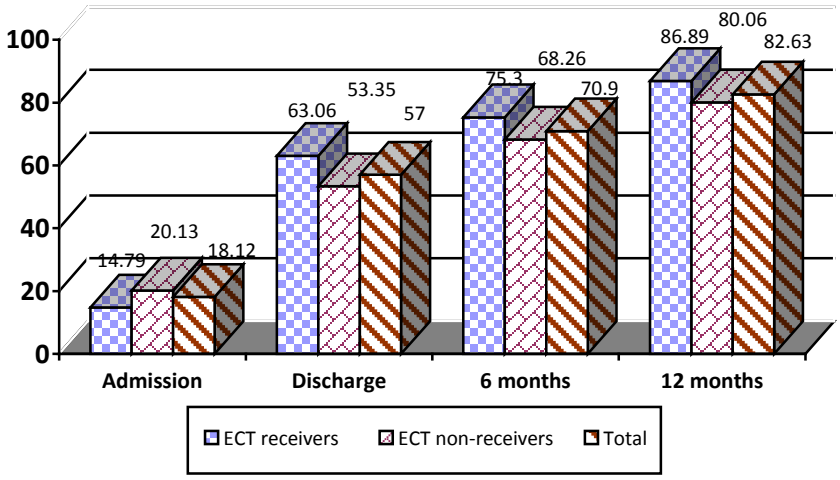
Table 5: Comparative scores, means and p values of Hamilton Depression Rating Scale (HAM-D) between ECT non-receivers and receivers at admission, discharge, 1st month, 6th month and 12th month [F32.2; F32.3; F31.5 AND OTHERS]

ECT Receivers vs. Non-receivers		HAM-D at admission	HAM-D at discharge	HAM-D 1 month later	HAM-D 6 months later	HAM-D 12 months later
ECT non-receivers	Mean	41.92	26.33	18.71	14.08	9.67
	N	24	24	24	24	24
	Std. Deviation	2.430	2.632	3.277	2.717	2.316
ECT receivers	Mean	44.20	20.47	12.67	8.13	4.60
	N	15	15	15	15	15
	Std. Deviation	3.005	3.925	3.331	4.518	3.521
Total	Mean	42.79	24.08	16.38	11.79	7.72
	N	39	39	39	39	39
	Std. Deviation	2.858	4.270	4.411	4.537	3.748
Statistical significance(p value)		0.013	0.0001	0.0001	0.0001	0.0001

Table 6: Comparative scores, means and p values of Young Mania Rating Scale (YMRS) between ECT non-receivers and receivers at admission, discharge, 1st month, 6th month and 12th month [F31.2; F30.2; 31.6 AND OTHERS]

ECT Receivers vs. Non-receivers		YMRS at admission	YMRS at discharge	YMRS 1 month later	YMRS 6 months later	YMRS 12 months later
ECT non-receivers	Mean	41.46	21.00	13.77	10.15	6.08
	N	13	13	13	13	13
	Std. Deviation	2.876	2.582	1.922	2.410	2.691
ECT receivers	Mean	44.38	15.85	8.62	10.23	3.00
	N	13	13	13	13	13
	Std. Deviation	2.844	5.857	5.042	12.788	3.240
Total	Mean	42.92	18.42	11.19	10.19	4.54
	N	26	26	26	26	26
	Std. Deviation	3.174	5.155	4.570	9.016	3.313
Statistical significance(p value)		0.016	0.008	0.002	.983	0.015

Fig 1: Comparative scores, means and p values of Global Assessment of Function (GAF) between ECT non-receivers and receivers at admission, discharge, 6th month and 12th month (The differences between all the groups were statistically significant at <.001 level.)



(Discharge<0.0001; 6months<0.0001 and 12th month<0.0001)

Discussion

There was significant decrement in BPRS in patients (as compared to admission) at discharge and subsequent follow-up. Improvement was more in ECT receivers than in non-receivers. Measurement decrements were more than 40-50% from the time of admission (details not shown in this study) which as compared to ECT non-receivers were statistically significant (Table 4: discharge<0.0001; 1month<0.0001; 6months<0.0001and 12th month<0.0001). Similarly there were more than 50-60 % improvement in HAM-D measurements (details not shown) in ECT receivers as compared to non-receivers which also showed statistically significant values (Table 5: discharge<0.0001; I month<0.0001; 6months<0.0001 and 12th month<0.0001). Measurement decrements were also appreciated in patients evaluated by YMRS by more than 50% from the time of admission (details not shown in this study) which as compared to ECT non-receivers were statistically significant (Table 6: discharge<0.008; I month<0.002; and 12th month<0.015). GAF measurement was improved by more than 50% (details not given) in all diagnostic category patients, but increased in ECT receivers which were statistically significant. Measurement improvement was more than 40-50% from the time of admission (details not shown in this study); which as compared to ECT non-receivers were statistically significant.

We believe this study is the first of its kind done in Nepal. ECT is infamously known in Nepal as *"Bijuli ko Jhadka"* or *"Electric Shock"* and carries misconception not only among lay people but also among medical professionals and media, which further contributes to negative stigmatization[10]. This leads to great resistance from patients and their family members. Thus ECT in Nepal (as in other countries including developed countries) is an important effective treatment but most of the time underutilized and often ignored. All the patients who received ECT in this study showed significant improvement in psychopathology and day to day functioning. Their quality of life improved, with great reduction in requirement of psychotropic drugs. The one year follow-up was achievable all the patients. Patients were in follow-up further than our study period of 12 months.

Our study shows ECT to be effective whenever they were indicated. But the clinical judgments and rationale for giving ECT becomes a critical decision for psychiatrist as there is so much of stigma attached to it. ECT was used in our study not only in mood disorders but also in acute psychotic episode, schizophrenia and related disorders and post partum psychosis. In acutely violent and agitated patients or patients showing disorganized and excited behaviour, it would be extremely difficult and problematic to

keep patients only on psychotropic drugs for 6-8 weeks as recommended by guidelines. Side effects of drugs and longer duration of hospitalizations also has to be considered. These are the reasons why ECT was considered in psychotic episode and schizophrenia. As compared with various studies, our study had shown ECT to be highly effective in mood disorders[11,12], acute psychotic episode[13,14], first episode schizophrenia[15,16]. ECT was also found to be effective in treatment resistant schizophrenia in this study. So it becomes important therapeutic choice if patients are not responding to treatment[17,18] to various drug trials in acute psychotic decompensation of chronic schizophrenia[19, 20, 21].

The number of ECT needed to achieve remission is 8-10[11]. The average ECT given in our study was 5.85.Reason for this being that we were using psychotropic drugs concurrently. So ECT acted as an "augmentation therapy" along with psychotropic drugs in patients, though prior to performing ECT, we tried to decrease the doses of drugs as far as practicable so that it won't counteract the anticonvulsant actions during the procedure. Our treatment policy on number of ECT that was given to patients was guided by either remission or recovery plateau[2]. This is important because in medication refractory patients, this "last resort" treatment can be expected to have its full effect.

There are few limitations of this study: (1) it is an open label study. (2) Psychotropic drugs and their doses were altered according to clinical judgment. (3) Other confounding variables not taken care of are duration of symptoms and previous episodes.

Conclusion

Historically, ECT has been poorly studied because of various reasons, like stigma and prejudice attached to the treatment, including technical drawbacks in the designs of the studies or general ambivalence in the medical and research community towards its use[22]. Though there is negative attitude in the community regarding its use, our study shows ECT to be highly efficacious treatment in all spectrums of psychotic and depressive illness provided rational clinical judgment is done on its use. As it is safely performed under anaesthesia, the risk of complications like fracture, death and significant cognitive decline that at one time characterized its side-effects is almost nil. And the most important of all, there is no accepted absolute contraindication to the use of ECT in treating severe mental illness.

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