ELECTROCONVULSIVE THERAPY AMONG ADOLESCENT PSYCHIATRIC PATIENTS- A RETROSPECTIVE STUDY

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ABSTRACT

BACKGROUND

Electroconvulsive Therapy (ECT) among adolescent psychiatric patient is rarely used and studies in this regard are also rare, while its need is of great importance.

Aim of this study was to study the prevalence of ECT in common psychiatric illnesses among adolescent age group, where it is indicated and outcome of ECT in those psychiatric patients.

MATERIALS AND METHODS

All data were collected retrospectively from the chart review for those adolescents aged between 12 to 18 years who received ECT during the period of 2008 - 2012. During the study period a total of 554 patients received ECT, among whom 104 were adolescents.

RESULTS

Adolescent patients were 18.77% in the whole ECT sample; the average age of the adolescents was 16.33 years and number of patients were more with older age. Among all the patients, 48.08% had positive family history of mental illness and 81.73% were from lower Socioeconomic Class. The use of ECT was more with schizophrenia (n= 63, 60.57%) and acute and transient psychotic disorder (n= 30, 28.85%). The most common indication was agitation and aggression (n= 29, 27.88%) followed by poor medication response (n= 19, 18.27%). Good response is found in most of the cases (n= 88, 84.62%), only a few percentage of cases showed minor and transient adverse event.

CONCLUSION

The result of our study suggests that prevalence of ECT among adolescent psychiatric patients is quite high and ECT is a safe and effective method of treatment in the adolescent psychiatric patients, especially those patients who are severely ill and poorly responding to medication.

KEYWORDS

ECT, Adolescent, Prevalence, Safe, Effective.

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BACKGROUND

Electroconvulsive Therapy (ECT) is a modality of treatment practices in Psychiatry since a few decades, whereby passing electric current through the scalp produces seizure under the medical supervision.[1] ECT in early years was painful, administered much higher current without Anaesthesia or muscle relaxants, but today it is more refined. Electrical currents is administered under controlled medical setting with carefully calculated dose to achieve maximum benefits with low risk.[2] According to WHO or UNICEF, adolescent comprises of 10 - 19 years of age group. There were 1.2 billion adolescents in the world in 2009, accounts to 18 percent of world population. Either the South Asia or the East Asia and Pacific Region resides more than half the World's adolescents. With 243 million adolescents in India occupies the top rank of the national population of adolescents followed by China (207 million), United States (44 million), Indonesia and Pakistan (both 41 million[3] deep emotional and physical changes are most prominent during adolescent period and vulnerable to the development of serious and damaging psychopathologies.[4] In 2009, UNICEF survey estimated around 20 percent of the world's adolescents have a mental health or behavioural problem. For people aged 15 - 19, depression contribute single largest global burden of disease and suicide constitute one of the three leading causes of mortality in 15 - 35 years' age group. Globally, around 71,000 adolescents commit suicide

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annually, while up to 40 times make attempt of suicide. Before age 14 about 50 percent, and by 24 years of age 70 percent of lifetime mental disorders started. In many countries, most of young people with mental health problems suffer needlessly and unable to access appropriate resources for recognition, support and treatment, while only a small portion get basic assessment and care. For effective prevention and assistance, general social support and greater public awareness of mental health issues for adolescents are essential.[3] Before 18 years of age, Early-Onset Schizophrenia Spectrum Disorder (EO-SSD) is a severe form of psychiatric disorder with poor outcome and more social disability than adult-onset schizophrenia spectrum disorder.[5] Studies found that among adolescents, various psychiatric disorders are also common as like adult. Harpaz-Rotem et al[6] found in their study in 1995 the various inpatient psychiatric disorders among adolescents are Adjustment disorder (13.0%), Hyperactivity (6.4%), Major depression (48.9%), Bipolar disorder (10.6%), Mild depression (23.2%) 365, Schizophrenia (2.1%), Substance abuse (17.0%), Anxiety (3.1%), Eating disorders (1.3%), Conduct (8.5%), Oppositional (7.0%) and Others (12.6%). Heuyer first reported the use of ECT in adolescents in the 1940s in France and by L. Bender in the United States. Although, evidences prove that Electroconvulsive Therapy (ECT) is safe, effective and cheap therapy and needed shorter time to resolve symptoms in the first line of treatment, still it is used rarely. In the late 1990s, the use of ECT was estimated to range between 0.5 and 1 adolescent per million yearly in the paediatric age group in the USA. Multiple case reports showed the efficacy of ECT in paediatric affective, psychotic and catatonic disturbance. Although, use of ECT in adolescents was very low, many authors still have raised questions of ethical concerns and alleged unknown secondary cognitive deficit with ECT attempting to ban ECT use in adolescents. Although, controversy is going on, both the American Psychiatric Association (APA) and the American Academy of Child and Adolescent Psychiatry (AACAP) do not consider age as a contraindication to ECT for specific indications of affective, psychotic and catatonic disorders where the conditions are treatment-refractory psychiatric disorder.[7] Although, ECT is banned in many countries and the discovery of more effective drugs to treat psychoses, still ECT is used in majority of countries and has not disappeared in adolescent psychiatric practices.[8] Clause 95, 1 (a) and (b) of Chapter XII of Mental Health Care Bill 2016, India (passed by Rajya Sabha), declared that (a) Electroconvulsive therapy without the use of muscle relaxants and Anaesthesia; (b) Electroconvulsive therapy for minors are prohibited and sub-section (1) Declared, in the opinion of psychiatrist in charge of a minor's treatment electroconvulsive therapy is required, then such treatment shall be done with the informed consent of the guardian and prior permission of the Concerned Board.[9] In the adolescents ECT is generally both effective and safe treatment, but treatment using ECT has been less reported in children of pre-pubertal age and is a controversial treatment. Therefore, ECT should be considered in severe cases life-threatening child psychiatric disorders, where it is as an effective and safe method.[10] In a recent survey found, 42% opposed ECT for young children and 19% opposed ECT for adolescents even in cases of psychotic (delusional) depression, but in contrast 100% were willing to prescribe antidepressant drugs.[11] Since Bender's time, only 114 cases have been discussed in the literature with excellent result, especially for patients with severe depression or catatonia. In a recent study at the Mayo Clinic of 20 adolescent patients, researchers found that ECT have very good result in reducing or eliminating symptoms in those with bipolar disorder, major depression and schizophreniform disorders without any adverse effects.[11] Walter G and Rey JM in their study in adolescent psychiatric patient found remarkable improvement or resolution of symptoms after completion of half of courses of ECT, mood disorder patients were most benefitted with having transient and minor side effects in the post-ECT period.[12] Very limited data are available from India on the use of Electroconvulsive Therapy (ECT) in adolescent psychiatric patient and also India is on the way of going to banning ECT administration in near future for adolescent and preadolescent psychiatric patients. So, our study wants to highlight the need of ECT in adolescent psychiatric patients. The present study is a retrospective study in a Tertiary Hospital Care Centre aimed to evaluate prevalence of ECT, clinical profile and outcome of ECT among adolescents.

MATERIALS AND METHODS

Setting- This study was carried out at the Assam Medical College and Hospital, a multispecialty teaching and Tertiary-Care Referral Hospital providing services to a major part of North East India.

Assessment- All patients who attended the Department of Psychiatry, both in outpatient as well as inpatient undergo a detailed assessment under the supervision of a consultant. Information was recorded in the case notes. Diagnoses are based on International Statistical Classification of Diseases, Tenth Revision (ICD-10).[13]

ECT Administration and ECT Machine- ECT was administered on both inpatient and outpatient basis, 2 to 3 times per week. Based on a review of his or her clinical status and previous treatment history, usually the consultant in-charge of the patient or by senior consultants makes the final decision about administration of ECT. In complicated cases, a second opinion usually was taken from another consultant of the Department. There was no mandatory guidelines followed regarding administration of ECT. A written informed consent was taken from patients and/or from their relatives for each patient. All the consenting patients were assessed clinically by psychiatrist and anaesthetist and underwent necessary investigations for General Anaesthesia. Brief-Pulse, bi-temporal and modified ECT was administered to those who were found fit. Indigenously manufactured brief-pulse, constant-

energy/current ECT machine was used. Dose of the current was calibrated in millicoulomb (range 60 - 540 mCu). The machine has settings for adjusting the duration of electric current passed. By keeping the frequency and pulse width, constant electrical dose of current was varied by changing the strength of current. If the patient did not have an adequate seizure (i.e. Motor seizure of 15-seconds duration), dose of the current was increased to another 60 millicoulomb at each time of failure and the stimuli were given immediately without delay. To determine the seizure threshold, a maximum of three stimuli were given during the initial session of ECT therapy. In subsequent sessions, the electrical dose was adjusted to compensate for decreased induration of seizure and rise in seizure threshold. The schedule of ECT administration was thrice a week (Wednesday, Friday and Saturday). In each patient ECT was given twice in a week, and in those patients, due to food intake or for any other reason, if the ECT was unable to be administered on the second scheduled day then it was administered the next scheduled day. Any sedative or hypnotic agents were withdrawn in previous night or any other drugs, which may interfere in seizure production were stopped. Under the supervision of senior residents and consultants, ECT was administered by a trainee resident with the help of an anaesthetist. As pre-anaesthetic medication, Atropine (0.2 - 0.3 mg) and glycopyrrolate (0.2 - 0.3 mg) was used, Propofol (10 mg/kg) was used for induction and succinylcholine (30 - 60 mg) was used for muscle relaxation. Before injecting succinylcholine, BP cuff was raised about 30 - 40 mmHg above the systolic blood pressure. Cuff method was used to estimate seizure duration. Motoric seizure of at least 15 seconds was considered to be an effective ECT. Response to ECT is rated by clinical examination and mental status examination regularly by trainee resident as well as by consultants each day during ward round. ECT was stopped either after another two successive ECT when the target symptoms were subsided or when symptoms reach a plateau of improvement. Discontinuation of ECT was also considered when the patient does not respond to four to six treatments or if the patients develop major complications (e.g. delirium, amnesia, etc.) during ECT treatments. Details of the treatment were documented by the trainee psychiatrist in the patient's case notes and also in the ECT register immediately after the completion of each ECT, which was checked weekly by the consultant in-charge of ECT services for completeness.

Procedure

The study was approved and given Ethical Clearance by the Institutional Ethical Committee. The ECT register was screened for adolescent psychiatric patients who underwent ECT during the period from 1st January 2008 to 31st December 2012. Patient's details were find out retrospectively from the ECT register and available patient's ticket. Diagnosis and other details were also cross-checked for accuracy from the inpatient admission register and case notes; 104 adolescent patients were identified out of 554 total ECT receiving patients. Patients from 12 to 18 years of age were included and those patients whose complete records were not available are excluded from the study. Various types of psychiatric disorders for which ECT was administered were paranoid schizophrenia, hebephrenic schizophrenia, catatonic schizophrenia, undifferentiated schizophrenia, post-schizophrenic depression, acute and transient psychotic disorder, psychosis NOS, mania with psychotic symptoms, bipolar affective disorder current episode hypomanic, bipolar affective disorder current episode mania with psychotic symptoms, severe depressive episode without psychotic symptom with suicidal attempt. Various types of data like socio-demographic, clinical, treatment related, etc. were extracted from these records.

Analysis

Data were presented in terms of percentage for categorical variables; mean and SD for the continuous variable. Statistical Package for the Social Sciences version 15 was used for statistical analysis of data.

Response to Electroconvulsive Therapy

Extent of ECT response of the patient was measured by the clinical assessment and by mental status examination on regular followup by the trainee psychiatrist and also during ward round by consultant psychiatrist by assessing the reduction of target symptoms. The patients who had registered greater than 50% decrease in target symptoms were considered to have shown response.

RESULTS

Electroconvulsive Therapy used in Adolescent Psychiatric Patients

During the 5 years study period from 2008 to 2012, in total 554 psychiatric patients ECT were administered and among these 104 patients were adolescent comprising of 18.77 percentage, of which 49 (47.12%) cases were male and 55 (52.88%) were female. A total of 518 course of ECT were administered among the 104 adolescent psychiatric patients (Table 1).

Socio-Demographic Profile

Age of the adolescent patients were in the range of 12.5 to 18 years with a mean age of 16.63 (SD 1.49) (Table 2). Maximum number of 44 (42.30%) patients were 18 years of age followed by 22 (21.15%) were 16 years of age. Most of the patients were Hindu 97 (93.27%), unmarried 99 (95.19%); 53 (50.96%) patients from nuclear family, 50 (48.08%) patients had positive family history of mental illness, 55 (52.88%) patients from rural background, most of the patients were educated up to high school 34 (32.69%) and middle school 26 (25.00%) and majority of the patients 85 (81.73%) from lower/upper lower (IV) socioeconomic class (Table 3).

Psychiatric Disorders for which ECT were Indicated-

Most common diagnosis of psychiatric illness among adolescent for which ECT were administered are Paranoid Schizophrenia comprising of 42 (40.38%) number followed by acute and transient psychotic disorder consists of 30

(28.85%) in number. Other psychiatric illness were 17 (16.35%) Undifferentiated schizophrenia; 4 (3.85%) Bipolar affective disorder, current episode of manic with psychotic symptoms; 3 (2.88%) Catatonic schizophrenia; 2 (1.92%) Bipolar affective disorder, current episode hypomanic; 1 (0.96%) Post-schizophrenic depression; 1 (0.96%) Residual schizophrenia; 1 (0.96%) Schizoaffective disorders; 1 (0.96%) Unspecified nonorganic psychosis; 1 (0.96%) Mania with psychotic symptoms and 1 (0.96%) Severe depressive episode with psychotic symptoms (Table 4).

Administration of Electroconvulsive Therapy

A total of 518 course of ECT were administered among 104 adolescent psychiatric patients with mean ECT of 4.98 (SD 2.05) ranges from minimum 1 to maximum 14. Table 4 shows the indication for ECT, most of the patients had more than one indication. Most common indication were agitation 29 (27.88%) followed by poor medication response 19 (18.27%).

A total of 88 (84.62%) cases showed good result, 4 (3.85%) had poor response to ECT and for the remaining 12 cases we could not draw any conclusion, because after giving 1 or 2 ECT further ECT could not be given and among these 4 (3.85%) were absconded, 4 (3.85%) had attendant refused and 4 (3.85%) patient refused (Table 4).

Most of the patient 85 (81.73%) had no adverse event following ECT. Only 19 patients experienced adverse event comprising of hypotension 9 (8.65%), amnesia 5 (4.81%), headache 4 (3.85%) and delirium 1 (0.96%) (Table 4).

Years	Total Number of Patients to whom ECT was Administered	No. of Adolescent Patients to whom ECT was Administered (Cases)	Percentage of Cases	Male Cases Percentage	Female Cases Percentage
2008	154	26	16.88	13 (50)	13 (50)
2009	122	32	26.22	12 (37.5)	20 (62.5)
2010	94	15	15.96	5 (33.33)	10 (66.67)
2011	115	20	17.39	10 (50)	10 (50)
2012	69	11	15.94	9 (81.82)	2 (18.18)
Total	**554**	**104**	**18.77**	**49 (47.12)**	**55 (52.88)**

Table 1. Distribution of Cases (Adolescent Patients to whom ECT was Administered) according to Year

Age in Years	Number of Cases (n)	Percentage	Average Age (In Years)
18	44	42.307	16.63
17	16	15.384	
16	22	21.153	
15	10	9.615	
14	7	6.730	
13	4	3.846	
12.5	1	0.096	
Total	**104**	**100**	

Table 2. Distribution of Cases (Adolescent in whom ECT was Administered) according to Age

Variables	Number of Cases (n)	Percentage
Age (Years)	16.63 (1.49) (Range 12.5 - 18)	
Religion:		
Hindu	97	93.27
Islam	7	6.73
Christian	0	0
Marital Status:		
Married	5	4.81
Unmarried	99	95.19
Family Type:		
Nuclear	53	50.96
Joint	51	49.04
Family History:		
Positive	50	48.08
Negative	54	51.92
Locality:		
Rural	55	52.88
Urban	49	47.12
Educational Status:		
Profession or Honours	0	0.00
Graduate or Postgraduate	0	0.00
Intermediate or Post	1	0.96
High School Diploma	34	32.69
High School Certificate		

Middle School Certificate	26	25.00
Primary School Certificate	22	21.15
Illiterate	21	20.19
Socioeconomic Status:		
Upper (I)	0	0.00
Upper Middle (II)	0	0.00
Middle/Lower Middle (III)	7	6.73
Lower/Upper Lower (IV)	85	81.73
Lower (V)	12	11.54

Table 3. Demographic Profile of the Study Subjects

Variables	Number of Cases (n)	Percentage
Diagnosis:		
Paranoid schizophrenia	42	40.38
Catatonic schizophrenia	3	2.88
Undifferentiated schizophrenia	17	16.35
Post-schizophrenic depression	1	0.96
Residual schizophrenia	1	0.96
Acute and transient psychotic disorders	30	28.85
Schizoaffective disorders	1	0.96
Unspecified nonorganic psychosis	1	0.96
Mania with psychotic symptoms	1	0.96
Bipolar affective disorder, current episode hypomanic	2	1.92
Bipolar affective disorder, current episode manic with psychotic symptoms	4	3.85
Severe depressive episode with psychotic symptoms	1	0.96
No. of ECT	4.98 (2.05) (range 1-14)	
Indication for ECT		
Agitation and Aggression	29	27.88
Attendant Demand	5	4.81
Catatonia	3	2.88
Early Recovery	15	14.42
Poor Medication Response	19	18.27
Poor Oral Intake	15	14.42
Previous Response to ECT	2	1.92
Psychomotor Retardation	1	0.96
Psychotic Symptom	12	11.54
Suicidal Attempt	3	2.88
Response To ECT (Based on Clinical Assessment)		
Absconded (could not comment)	4	3.85
Attendant Refused (could not comment)	4	3.85
Good	88	84.62
Poorly Responded	4	3.85
Patient Refused (could not comment)	4	3.85
Post-ECT Adverse Event		
Amnesia	5	4.81
Delirium	1	0.96
Headache	4	3.85
Hypotension	6	5.77
Nil	88	84.62

Table 4. Details of ECT Administration

DISCUSSION

Use of ECT in adolescents is a highly efficient treatment option for many psychiatric disorders with high remission rates, and a few and a relatively benign adverse event lasted for few days. By using the correct technique, the risks can be mitigated and considered minimal when compared to the efficiency of ECT in the treatment psychopathologies.[14] The first studies on use of ECT in adolescents was dated back to 1980s, so the research on the use of ECT in adolescents can be considered recent. Despite the ECT is the treatment of choice for many psychopathologies depending on diagnosis and severity of symptoms, still its lack of response compared to psychopharmacotherapy in adolescents.[14] Studies in relation to use of ECT in adolescents are rare in India as well as throughout the world as many controversies are going on since years regarding the use of ECT in adolescents and many countries already banned ECT and India is on the way of banning. The present study is a retrospective study to show the use of ECT in adolescent psychiatric patients; is a very effective method of treatment and its banning will hamper the treatment of this group of patients, especially in the treatment of resistant cases. Our study shows, during

the 5-year period 18.77% patients were adolescents among the entire patients those who were treated with ECT, which is less than the finding of Zhang et al 2016.[15] Lower prevalence in our study could be due to more stringent criteria for the indication of ECT. Average age of adolescent patient was 16.63 (SD 1.49), which was lower than the finding of Karayagmurlu et al 2015[14] and the number of cases were more with increasing age, consistent with the finding of Zhang et al 2016.[15] The socio-demographic data reveals almost half of patients (50.96%) were from nuclear family; 48.08% of patients had positive family history of mental illness, a unique finding in our study and need of ECT administration in those patients could be due to more severe psychopathology. Most of the patients from lower socioeconomic class 81.73% and could be because of majority of the patients were schizophrenic, a disorder common in lower socioeconomic class.[16] The most common diagnosis was schizophrenia (60.57%), which was consistent with findings of Grover et al[17] followed by acute and transient psychotic disorders (28.85%), but Grover et al found depression is the second most common. Number of ECT per patient was 4.98 (SD 1.49), ranges from 1-14 a figure less than finding Grover et al[17] where they had 10.1 (4.87) (range, 2-21). This could be because we had not excluded any patient, even those who had not completed their course of treatment. Most common indication was agitation and aggression (n= 29, 27.88%) followed by poor medication response (n= 19, 18.27%), early recovery and poor oral intake, both had 15 (14.42%) and for psychotic symptoms (n= 12, 11.54%), but Karayagmurlu et al 2015[14] found in their study pharmacotherapy resistance (n= 10, 33.3%), intense suicidal ideation (n= 8, 26.7%), excitation (n= 6, 20%), catatonia (n= 5, 16.7%) and pregnancy (n= 1, 3.3%). Rate of response to ECT were good (n= 88, 84.62%, poor in 4 patients (3.85) and for rest 12 patients could not be commented because they did not complete their course of treatment. Parmer 1993,[18] Schneeklot et al 1993[19] and Paillere-Martinot et al 1990,[20] Baghai and Moller 2008[21] also found good ECT response in adolescent psychiatric patients, but the figure of our study was greater than the finding of Grover et al. This could be because no scale were used in our study for the pre- and post-ECT comparison, rather patients were assessed by clinical and mental status examination. Most of the patients had not experienced any adverse event (n= 88, 81.73%), only a few patients experienced transient adverse events, hypotension (n= 9, 8.65%), amnesia (n= 5, 4.81%), headache (n= 4, 3.85%) and delirium (n= 1, 0.96%) which was consistent with many existing research. They also found very minor transient adverse event with ECT. No mortality was found in our study.

Our study is limited by retrospective design, small number of sample, lack of evidence of simultaneous use of drug profile, lack of scale to measure the outcome properly and lack of comparison group.

CONCLUSION

The result of our study suggests that prevalence of ECT among adolescent psychiatric patients is quite high (18.77%) and ECT is a safe and effective method of treatment in the adolescent psychiatric patients, especially those patients who are severely ill and poorly responded to medication. Hence, the uses of ECT in appropriately indicated adolescent psychiatric population should be re-evaluated and further prospective studies are recommended.

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