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Original Article:

Is Electroconvulsive Therapy Fading into Oblivion? - A Study of Ten Year Trends.

Authors
Aruna G, Associate Professor, Department of Psychiatry, Fr. Muller Medical College, Kankanady, Mangalore - 575002,
Muralidhara B Yadiyal, Associate Professor, Department of Medicine, Kasturba Medical College, Light House Hill Road, Mangalore - 575001.

Address for Correspondence
Aruna G,
Associate Professor,
Department of Psychiatry,
Fr. Muller Medical College,
Kankanady, Mangalore - 575002.
E-mail: arunag2779@gmail.com

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Abstract: Background: Despite proven efficacy, modified ECT has been variably used in the recent past, with data on the usage trend being scarce, worldwide. Aim: We aimed to do a time – series analysis to examine annual trends in modified ECT use in our tertiary teaching hospital in the last decade. **Methods:** A chart review was carried out on all patients who received m-ECT in our teaching hospital in the last ten years (2002 to 2011), and percentage of total inpatients receiving M-ECT each year was deduced. Along with number of ECT sessions given per year, details of demographic data, and indications for ECT were recorded. **Results:** In our study ECT was undersized as a treatment option, with only 1:13% of total inpatients having received ECT. Also it was noted that use began increasing from 2002, reaching a peak in 2006 (84% increase) followed by a downward trend, with a sharp decline since 2008 (61%decrease) and finally reaching a nadir in 2011 (69% decrease). Mean age of patients ranged from 31.28 to 40.1 years with a slightly high female preponderance in most year groups. The most common indication for ECT use was schizophrenia (47.8%) followed by, depression (38.9%). **Conclusion:** Although, our study finding is in line with the downward trend of ECT utilization rates reported worldwide, the nature and magnitude of decline cannot be explained nor compared globally due to variations, inaccuracies and heterogeneity of ECT data currently available. Further, factors responsible for such trends should become focus of future research.

Key Words: Modified Electroconvulsive Therapy; Utilization; Trends

Introduction:

Its been more than seventy years since Ugo Cerletti and Luigi Bini demonstrated Electroconvulsive Therapy (ECT)for the first time in Rome in 1938 as a treatment option in alleviation of psychotic and depressive symptoms. It still remains to be one of the most effective somatic treatments in field of psychiatry.(1) ECT is per se the application of electrical current to the scalp to induce a generalized electrical seizure in the patient to relieve him of his psychiatric symptoms and this principle has still much remained the same. In modified-ECT, which is the current standard mode of ECT recommended (2,3), modifications include replacement of originally used 120v.

Sine-wave electrical current by newer brief- pulse electrical current wave devices, with unilateral placement of electrode option and use of muscle relaxants and short term general anesthesia. This has significantly contributed to the reduction of mortality and morbidity associated with the ECT use making it more tolerable and humane for the patient generally.(4,5) Though ECT was used originally for treatment of schizophrenia, it has been proven effective in treatment of severe depression, mania, bipolar disorder and other acute psychotic states including catatonia over the years.(6-8) However with the introduction and evolution of more neuroleptics and mood stabilizers, coupled with the controversies hovering around ECT, its use declined in the 1970s and 1980s. In spite of all the medications available, there is still a group of patients in psychiatry who are treatment resistant, have residual or chronic symptoms, have rapid- cycling mood states, have relative or absolute contra indications for pharmaceutical agents, have repeatedly attempted suicide, are severely impaired in socio-occupational functioning, are in acute hyper or hypo excitable states (like catatonia), or where rapid clinical recovery is desired owing to social or personal circumstances. It is in these instances where ECT still has an important role in management. Amidst controversy existing over the use of ECT as a first –line option or as a last resort treatment modality, both the APA (American Psychiatric Associations) and UK's National Institute for health and clinical excellence (NICE) guidelines recommend ECT for

patients with severe depression, catatonia, severe or prolonged mania, resistant schizophrenia, or schizoaffective disorders along with clinical indications like use in patients intolerant of or resistant to medications, those with previous good response to ECT, when there is need for a rapid and definitive recovery (like acute psychosis, or risk of suicide). The 2011 APA ECT guidelines even recommend ECT to be a safer option than other alternative treatments in the infirm elderly and during pregnancy and lactation.(2,3,9-12)

In the face of such irrefutable evidence present regarding utility and efficacy of M-ECT, its use was justified and hence the utilization rates rose gradually. But in the recent times, ECT use is again noticed to be dwindling downwards or can be said to be variably utilized at best.(13,14) Despite decline in ECT usage, it has been noticed that research on ECT have increased in the recent decades, with most of the papers describing refinement in ECT procedure, establishing efficacy of ECT in various disorders, or on neurobiology and long term follow up of ECT.(15) In spite of this fact, studies on trends of ECT usage compared over the years (especially in last 5 years) are scarce or inaccessible worldwide, more so in developing countries like ours.

The present study was an attempt at studying the pattern of ECT usage in our tertiary teaching hospital in the last 10 years and to analyse the finding s in the wake of contemporary research data available globally on this disturbing issue of health treatment.

Materials and Method:

Setting: This study was carried out at the Father Muller Medical College Hospital, Mangalore, a multi specialty teaching and tertiary – care referral center (for psychiatry), with patient population mainly from districts of coastal Karnataka and neighbouring state of Kerala.

Assessment: All patients who consult us undergo a detailed assessment by a trainee resident under the supervision of a consultant who then decides on requirement of an admission. All information is subsequently recorded duly in case notes. Diagnosis are based on International Statistical Classification of Disease, Tenth revision [ICD-10].(16)

ECT Machine and Administration: ECT is administrated mainly on inpatient basis only. The final decision to administer ECT is done by the consultant in –charge of the patient, after discussion with other members of the team. In case of complications, second opinion is sought from unit heads. The decision to administer ECT is an individually – tailored one, based on review of his / her clinical condition and previous history. Though no mandatory guidelines are followed, adherence to standard guidelines available is maintained as far as possible.(2,3) If ECT is indicated, written informed consent is taken from patients and their relatives. Those who give consent are assessed physically in the pre- anesthetic check-up conducted by the anesthesiologist. If found fit, the patient is administrated brief pulse, bilateral, modified- ECT using a brief- pulse, constant energy / current machine (Niviqure Meditech Private Ltd, Jayanagar, Bangalore) Pulse current calibrated in miliamperes (pooma) with pulse frequency between (0-200 H3). EEG /ECG monitoring (version 9.0) was introduced in 2009 (Niviqure computerized SPO2 Module). Electrical dose is varied by changing dose in milli-columbs from 30 MC to 540 MC ranges, keeping the frequency & pulse constant (Pulse duration on 0.2- 20sec). ECT is usually administered twice/ thrice a week, keeping a gap of 24-48 hrs between each session, usually in the morning time, by a trainee resident with the help of an anesthesiologist, supervised always by the consultant–in–charge. Atropine (0.2- 0.3 mg) is usually used as premedication, thiopental sodium (150-450 mg) for induction and succinyl choline (30-60 mg) for muscle relaxation. Cuff method is used to isolate the limb and motor seizure duration is estimated. Motor seizures of at least 15-20 seconds are considered to be adequate ECT response. ECT is stopped once remission is achieved or when symptoms reach a plateau after 2 consecutive sessions. ECT is discontinued in case of non response or advent of untoward complications like delirium. Treatment details are recorded in patient's case file and in discharge summary for future reference. All sedative / hypnotics, or drugs known to interfere with seizure induction are withheld 24 hours prim to ECT administration.

Procedure: The study was approved by the departmental research review committee. The ECT register was screened for patients posted for ECT during the period January 2001 to December, 2011. A year wise tabulation was done, where in variables like number of total inpatients, number of patients receiving ECT, number of ECT sessions given along with relative percentage values were recorded on per- year basis. The required socio- demographic and clinical data was extracted from these records and documented again on a per-year basis.

Analysis: Descriptive statistics in terms of percentage was used for categorical variables. Mean was calculating for the continuous variables.

Results:

Electroconvulsive Therapy use: Our hospital, being a tertiary level teaching hospital and referral center for psychiatry boasts of a huge inpatient and outpatient population, with the total number of in-patients in the study period of ten years (2002 to 2011) being 16,624 (n-16,624). Out of this, only 1.13% (n=189) patients received ECT as on treatment option. The year wise tabulation showed a peak of 2.14% in year 2006 and fell below 1% from 2008 onwards to a nadir of 0.32% (in 2008) and 0.40% (in 2011).

Table 1: Number of inpatients receiving m-ECT from 2002 to 2011

Year	Total number of inpatients	No of patients received M-ECT	Percentage of patients who received M-ECT(%)
2002	1435	25	1.74%
2003	1487	29	1.95%
2004	1491	20	1.34%
2005	1563	28	1.79%
2006	1582	34	2.14%
2007	1679	21	1.25%
2008	1843	6	0.32%
2009	1853	8	0.43%
2010	1730	10	0.57%
2011	1961	8	0.40%
Total	16,624	189	1.13%

During the study period of 10 years (from January 2002 to December 2011), a total of 638 sessions of ECT were administered. Out of which 461 sessions were given in the first 5 years itself (From January 2002 to 2006) accounting for 72.26% of total ECTs given. A sharp decline was noted from the year 2007 (12.85%) till the year 2008 (3.91%). Thereafter, there has been a steady downwards trend, with the last four years (2008-2011) together accounting for only 14.89% of the total ECT s given, reaching the lowest point in the last year 2011, which accounted for 3.13% of ECT's only (see table: 2). If we take the 65 ECT sessions given in the first year of study (i. e, in 2002), as the index point, we can observe that ECT use began escalating gradually from 2002 and reached a peak in 2006 (120 sessions) showing a remarkable 84% increase. This was followed by a downward trend, with a very obvious sharp decline of 61% noticed in 2008 (25 sessions), finally reaching a nadir in 2011 (20 sessions) with 69% decrease from the index value. [See Graph 1].

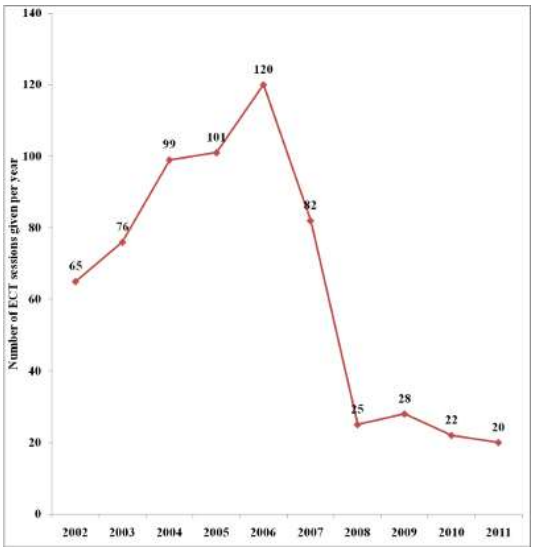

Fig 1: ECT rates in Fr. Muller's Medical College, 2002-2011

Table 2: Electroconvulsive Therapy use from 2002 to 2011		
Year	No of ECT's given	Percentage (%)
2002	65	10.18%
2003	76	11.91%
2004	99	15.51%
2005	101	15.83%
2006	120	18.80%
2007	82	12.95%
2008	25	3.91%
2006	28	4.38%
2010	22	3.44%
2011	20	3.13%
Total	638	100%

Socio-demographic Profile: The mean age of patients at the time of receiving ECT ranged from 31.28 to 40 years on a year to year basis. A slight female preponderance was noticed (F/M> 1) in 6 non consecutive years (in 2006- 2005, 2007, 2009) Whereas males outnumbered females by a small number in 2 years (in 2006, 2011). No gender difference was noted in another 2 years of study (In 2008, 2010). (See Table: 3). Other data regarding education, occupation, socio-economic class, place of residence, religion, family type, etc was not studied as it was beyond the scope of this study.

Table 3: Socio demographic profile of patients who received ECT from 2002 to 2011		
Year	F/M ratio	Mean age in years
2002	1.08:1	31.28
2003	2.62:1	33.34
2004	1.22:1	38.4
2005	1.11:1	33.5
2006	0.76:1	37.8
2007	2.42:1	35.8
2008	1:1	40
2006	2.92:1	33.37
2010	1:1	34.3
2011	0.33:1	33.5

Clinical Profile: Out of a total 638 ECT sessions, 305 sessions were administered for patients diagnosed to have schizophrenia (47.8%), making it the most common indication for ECT in our study report. It was followed by 248 sessions for severe depression accounting for 38.9% of total, 58 sessions for bipolar mood disorder (9.1%) and 27 sessions for acute psychiatric states including catatonia amounting to 4.2% of total ECT s [see Table 4].

Table 4: Indications for ECT use in the study period (2002-2011)		
Indications for ECT	No of ECT sessions given	Percentage (%)
Schizophrenia	305	47.8%
Severe Depression	248	38.9%
Bipolar Mood disorder & other mood disorders	58	9.1%
Other acute psychiatric states including catatonia	27	4.2%

Discussion:

ECT is an effective and safe treatment for many psychiatric disorders including treatment resistant schizophrenia, severe depression with suicidal ideation, hyper excitable states in mania, bipolar disorders and rapid cyclers, acute psychotic episodes including catatonia.(6,16-21) Though, with availability of effective, safe and newer psychotropic medications in the market, the use of ECT has drifted down in the treatment algorithm, where in, it is no longer considered to be a first –line option even for indications stated above. Clinical indications like non response to psychotropic medications, acute, atypical and severe psychiatric conditions, states where rapid recovery is desirable, or conditions where in pharmaceutical agents may be unsafe, still dominate the need for ECT, rather than primary diagnostic indications.(2,3,23,24) Though some authors still opine that there is no need to save the best for the last (24), currently only a subgroup of patients are considered for ECT all over the world. Compared to western countries, it is however, used more frequently in India, probably to reduce the duration and cost of hospital stay.(25) Despite of proven efficacy, safety and cost- effectiveness, the utilization and practice of ECT was seen to be dwindling, mostly downwards, both in the global scenario and also in the developing countries.(5,15) However, there is a lack of data from the global community, more so from the developing countries, regarding trends of ECT utilization rates compared over the years especially in the recent past. The present study attempts to fill this void, although its findings are limited by its retrospective design and the small number of patients derived from only one particular teaching hospital psychiatric facility located in state of Karnataka. Nevertheless, certain trends regarding the utilization rates of ECT were discernible.

In our study report of ten years it is seen that ECT has been given as a treatment for only 189 patients out of an abundant 16, 624 in patient population; amounting to less than 2% of the total [1.13%]. The above finding points out to the obvious fact that ECT, as a treatment option, has been underutilized in our treatment setting. In most Asian countries, utilization rates of ECT among inpatient population varied between <9% to as high as 26%.(26) Similar rates were found in most teaching hospitals in India and though lesser percentages were noticed in same hospitals in India and though lesser percentages were noticed in same hospitals, it was rarely as low as 2% as in our study.(27) Speaking in global terms, highest ECT use rates were noted in Africa, [21-28%] followed by that in Nepal [22%].(28,29) Lowest rates were seen in USA [0.4-1.3%], Hong Kong [0.6-1.8%] and in certain party of Europe like in Hungary [0.6%].(30-32). Intermediate rates of use were noticed in Australia [1%-8%].(33)

Our study findings also show that, almost three- fourths of all ECT s were given in the first 5 years itself and though a rise was seen from 2002 to 2006, thereafter, a sharp decline was also very noticeable. This trend of declining use of ECT in

recent years was also reported in other parts of India, though, national and registered data werenot available. Although, an a broader outlook, it could be safely stated that the total ECT utilization rates declined elsewhere too. Studies on ECT mainly focused on criticism of unmodified ECT, improvisions in ECT procedure, newer indications of ECT, or a neurobiology of mechanism of action of ECT, rather than depicting trends of ECT use over a time- line course.(15,25-27,34) In global statistics, ECT utilization rates are calculated as treated persons rates (TPR) i. e, number of ECTS per 10,000 resident population per year. Overview of TPR rates shows that there is a large variation in ECT utilization and practice worldwide. TPR varied from 0.75 in New Zealand (35) to 4.4 in Australia.(33) TPR showed a lot of variation in USA ranging from 2.38-5.10 (36) with a 1988 study showing a wide variation from 0.4 to 1.2 patient per 10,000 population with 36% of the sample not having ECT as a treatment option.(37) Studies of recent years also showed similar pattern of variation in rates of utilization in great Britain, Spain and Ireland with TPR lowest in Poland to moderate in 1.70 in Ireland and 2.20 in Wales to 4.30 in Norway.(5,38,39) In South Africa, TPR was 1.26 (29), and in Asia, TPR was 1.15 in Thailand (40), 0.27-0.34 in Hongkong.(32) All these studies reveal cross- sectional data and do not indicate trends over time. Moreover most studies are done at least 5 years back. However, the Scottish ECT accreditation Network (SEAN) published its annual report in 2009 which revealed downward trends in ECT use in various places like Australia, Denmark, Texas, California, Sweden and Wales.(41-43) The Texas departments of state health services have published statistics on use of ECT for 2011, where a drop has been noticed.(42) In California, ECT use fell nearly by two- thirds as early as in 2002 itself.(41) Some studies even depicted relatively stable rate of ECT use in Canada and in older adults, but that was prior to 2006.(44)

On the whole, the downward trend was generally noticed worldwide, which makes our study findings, broadly consistent with other national and international studies. However, the nature and magnitude of decline can not be subjected to comparison on a global scale due to inaccuracy and heterogeneity of ECT data currently available globally. Moreover, what was more evident in studies done worldwide was a large global variation in ECT- utilization, administration and practices.(5,37)

The socio – demographic profile of our study was limited to collection of data only on age and sex of the patient, in order to keep the study and statistics, simple and comprehensible, though it may be considered as one of the limitations of the study. In our study, the mean age of the patients ranged from 31.28 to 40 years, mainly implicating younger population, though in some studies, older adults are more likely to get ECT as a treatment option.(5,37,44) Our study also showed a slight female preponderance (F : M ratio ranging from 1.08:1 to 2:92:1) in six out of ten years, which is in line with other statistical studies done, where in women are found to be over represented in some countries like USA, Canada, Australia, New Zealand and the UK. For example, in Canada, between 62- 68% of ECT patients were women (41,44); in Texas, USA, in 2010-2011, 69% of ECT patients were women (42); in Victoria, Australia, in 2009-2010, 68% of ECT patients constituted females (43); in Scotland in 2010, females accounted for 68% of total ECT patients.(41) But equal gender distribution was also seen in some countries like Sweden.(41) We also found a male preponderance among patients receiving ECT in studies done in India and also in some western countries.(27,45,46)

The clinical profile of patients in our study group suggested the most common indication for ECT use was a diagnosis of schizophrenia accounting for 47.8% of total ECTs given. This is consistent with findings of other studies done in India and other developing countries of Asia, Africa, Latin America and Russia, where ECT is predominantly prescribed to a younger population with schizophrenia.(5,15,18,27,34,44) Our next common indication was depression followed by bipolar mood disorder, which is again in keeping with a similar trend reported in Asian countries by other researchers, where in, one – third of patients who received ECT were diagnosed to have depression (26,28,47) though in Western countries ECT is increasingly been used for depressive and mood disorder patients.(5) Discrepancies in indication could be due to differences in diagnostic practice, a lower recognition and under treatment of depressive & bipolar mood disorders, and also lower mental health care budgets.(5,40)

The most obvious finding in our study is a noticeable downward trend in ECT utilization rate, especially post 2008. This is keeping with the worldwide general tendency toward low, within – country ECT utilization rates. This might indicate a trend toward ECT being provided only by specialized units or worldwide paucity in ECT training (34,40,48,49) or even changing treatment trends where in ECT has slipped down the treatment algorithm as a last resort treatment option. Shortage of anesthesiologists and negative images regarding ECT could be another factor in lower usage rates.(47,50,51) Despite known efficacy, the use of ECT still generates considerable controversy and stigma and is viewed as harmful by general public , psychiatric patients and even mental health professionals.(52-55) It has been even negatively portrayed in popular media and movies like ‘One Flew Over The Cuckoo’s Nest’, ‘House on Haunted Hill’ and Requiem for a Dream, etc.(56-58) In addition to this, large array of pharmaceutical agents, now easily available and aggressively marketed by profit – minded pharmaceutical giants, have pushed ECT option into a dark corner of prejudice backed only by a few enthusiasts today.(59) Lack of pharmaceutical marketing for ECT could be one of the forces behind lower ECT usage rates along with stigma attached to this valid and approved form of treatment, though, this stands to be just a speculation among authors of this study. Though most reviews characterize ECT as safe and effective with transient and subjective side effects only, its image has been tarnished by anti psychiatrists who view ECT as a dangerous, inhumane, violent and unethical procedure and whole - heartedly advocate for its total abandonment.(60-64) Despite such debate, what is to be noted is that M-ECT is still used worldwide and endorsed by international bodies like APA & NICE who have offered professional guidelines for the same, with the Mental Health Act permitting use of modified ECT with informed consent, justified indications and proper safety standards.

Conclusions:

Though underutilization and a definite downward trend in ECT usage in recent years shown in our study findings was in line with the overall trend seen worldwide, comparison becomes increasingly difficult due to evident large variations present in ECT utilization and practice between countries, and regions, worldwide. Although, diverse reasons for this trend can be analyzed on basis of lack of equipment/ personnel, presence of side- effects, negative evaluation, matters of convenience, economy, and marketing, explanations of these variations are complex, encompassing both diversity in organization of psychiatric services and professional’s popular beliefs and attitudes concerning ECT. Further factors responsible for such trends and variations should be the focus of future scientific research.

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