International Journal of Medicine Research
ISSN: 2455-7404; Impact Factor: RJIF 5.42
www.medicinesjournal.com
Volume 1; Issue 2; May 2016; Page No. 159-160

Comparison conventional SINE WAVE modified ECT with newer BRIEF PULSE modified ECT modes with respect to efficacy and cognitive impairment

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Abstract
ECT and cognition have been best studied in connection with memory functions, as memory affects the sufferer predominantly and its assessment is more standardized. There is substantial evidence to document that ECT produces memory impairment. The percentages of EFFICACY at 3rd and 6th ECT with respect to baseline (0th) scores, 44.57% and 73.30% of SINE WAVE ; 56.63% and 91.30% of BRIEF PULSE. Percentages of IMPAIRMENT at 3rd and 6th ECT 13.69% and 34.05% of SINE WAVE and 4.95% and 9.90% of BRIEF PULSE

Keywords: ECT, SINE WAVE, BRIEF PULSE

Introduction

Currently, of the various available treatment modalities like pharmacotherapy, psychotherapy or physical treatments, electro-convulsive therapy (ECT) is the most effective and immediately relieving treatment for depression mainly in acute conditions. No trial has ever found an antidepressant medication regimen alone to be more effective than ECT [1, 2]; though efficacy of antidepressants increases with ECTs.

While the efficacy of ECT becomes evident soon after the 1st ECT, the time to achieve maximal response is also more rapid than that with psychotropic medications and likelihood of obtaining significant clinical improvement is often more certain with ECT than with other treatment alternatives [3, 4].

ECT and cognition have been best studied in connection with memory functions, as memory affects the sufferer predominantly and its assessment is more standardized. There is substantial evidence to document that ECT produces memory impairment [5].

There are two modes of delivering the stimulus in ECT. Conventional SINE-WAVE type also called CERELETTI-BINI TECHNIQUE (CBT) and the newer BRIEF-PULSE type also called BRIEF STIMULATION TECHNIQUE (BST). For the sake of convenience, the acronyms CBT and BST would be used hereafter.

It was appreciated that there were transient forms of brain dysfunction, sometimes of considerable severity with conventional Sine Wave type of ECTs, which were characterized mainly by confusion, the duration of which commonly increases after serial ECTs, and by an impaired ability to lay down new memory traces that may persist for some weeks after termination of the course of treatment.

This study proposes to compare the relative efficacy and adverse effects resulting from SINE WAVE and BRIEF PULSE TECHNIQUE.

Methodology

For the purpose of the present study, 50 consecutively presenting patients fulfilling inclusion as well as exclusion criteria were recruited. Enrolled patients were allotted numbers in serial order, patients bearing ODD numbers were assigned to SINE WAVE and patients bearing even number were assigned to BRIEF pulse.

Efficacy and cognitive impairment were assessed by applying scales.

Thus, HAM-D was applied to assess EFFICACY and PGI-Memory Scale was applied to assess memory.

Initial assessment was done before start of treatment to obtain baseline reading. Thereafter, patients were assessed after 3rd and 6th ECT treatments.

Patients were posted for ECTs on every alternate day i.e. thrice a week. The data obtained were tabulated which appears under observation and results. These results were subjected to statistical analysis with help of qualified statistician.

Inclusion Criteria

1. Subjects were recruited regardless of sex.
2. Age: 18-45 years
3. Patients who fulfill the criteria of SEVERE DEPRESSION according to ICD-10 having

A. 1. Pervasive low mood.
2. Loss of interest and enjoyment.
3. Reduced energy leading to easy fatigability and diminished Activity.

B. 1. Reduced concentration and attention.
2. Reduced self esteem and self confidence.
3. Ideas of guilt and unworthiness.
4. Bleak and pessimistic view about future.
5. Ideas or acts of self harm or suicide.
6. Disturbed sleep.
7. Diminished appetite (Wt loss up to 5%)

Severity of depression and need for ECT is considered by following factors:

a. Pronounced thought, mood and motor activity impairment.
b. Accompanied with active suicidal ideations.
c. Presence of mood congruent or incongruent psychotic symptoms.
d. Severe impairment in oral intake.

Exclusion Criteria

1. Patient bearing any other co-morbid Axis I diagnosis.
2. History of any major or unstable medical condition not fit for short General Anesthesia.
3. Depression due to organic causes.
4. Substance abuse.
5. Any contraindications for ECT like Increased ICP or Space occupying lesions.

Results

Table 1: Age Distribution

AGE	No of Patients
18-24	01
25-31	18
32-38	18
39-45	13

The above table shows the distribution of patients between age group 18-45 yrs, 70% of the study is constituted from age group 25-38 yrs.

Table 2: HAM-D Scale

No of ECTs	SINE WAVE	BRIEF PULSE
'0th' ECT	33.56±4.18	35.88±3.67
'3rd' ECT	18.6±5.08	15.56±2.63
'6th 'ECT	8.96±3.75	3.12±2.22

Representation of scores of HAM-D along with MEAN and STANDARD DEVIATION of 25 patients from each group before administration of ECT "0th", after 3rd and 6th ECT

Table 3: PGI memory scale

No of ECTs	SINE WAVE	BRIEF PULSE
'0th' ECT	94.32±1.99	96.12±0.78
'3rd' ECT	81.4±3.02	91.36±1.28
'6th' ECT	62.2±2.46	86.6±2.01

Representation of scores of PGI Memory Scale along with MEAN and STANDARD DEVIATION of 25 patients from each group before administration of ECT "0th", after 3rd and 6th ECT

Table 4: Efficacy

WAVE FORM	At 3rd ECT	At 6th ECT
Sine (EFFICACY)	44.57%	73.30%
Brief (EFFICACY)	56.63%	91.30%
Sine (IMPAIRMENT)	13.69%	34.05%
Brief (IMPAIRMENT)	4.95%	9.90%

Percentages of EFFICACY and IMPAIRMENT of 2 groups at 3rd and 6th ECT in graphical and tabulation form

Discussion

50 patients who met the inclusion criteria for the study were selected. Each group has 25 patients. All 50 patients are subjected to HAM-D and PGI memory scale; so as to maintain an objective assessment of patient's severity of depression and also the memory score, their scores labeled as '0th' (before ECT) and during ECTs (3rd and 6th) were tabulated.

In this study, significant decrease in HAM-D scores of Brief Pulse ECT than Sine Wave ECT; appearing Brief Pulse showing faster recovery than Sine Wave as observed by FINK *et al* [6]

This study shows decline in PGI Memory scores in both the groups; significant evidence of memory impairment as said by GANGADHAR *et al* [5] as a cognitive adverse effect of ECT.

The impairment is significant with Sine Wave as compare to Brief Pulse as quoted by most of the above mentioned studies

The percentages of EFFICACY at 3rd and 6th ECT with respect to baseline (0th) scores, 44.57% and 73.30% of SINE WAVE ; 56.63% and 91.30% of BRIEF PULSE.

Percentages of IMPAIRMENT at 3rd and 6th ECT 13.69% and 34.05% of SINE WAVE and 4.95% and 9.90% of BRIEF PULSE

Hence agreeing with CARNEY *et al*, ANDRADE *et al*, SCOTT *et al*, FUJITA *et al* stating there is no difference between efficacy of SINE WAVE and BRIEF PULSE

Conclusion

- There is significantly higher impairment in memory with SINE WAVE as compared to BRIEF PULSE.
- The impairment in memory increases with number of ECTs given, mainly with SINE WAVE

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