The Duration of Induced ECT Seizure and Therapeutic Outcome

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Abstract

Fit is an important component of electro-compulsive therapy. What constitute an adequate duration of fit remains undecided. This study examines eighty ECT cases; 23 females and 57 males; with a total of 435 sessions. I.C.D. diagnosis of mood disorder (63 cases) and Schizophrenia (17 cases). Observing bilateral induced fir for at least 15 seconds duration was the criterion examined to label an induced fit as adequate. Variables influencing the duration of induced fit were studied. The most significant findings were the relationship between short fit and concurrent administration of Benzodiazepines and Carbmazepines, and relationship between long fit and good clinical outcome.

.Introduction: In recent years, there has been concern to demonstrate scientifically the effectiveness of ECT. This has arisen for two reasons:
Firstly, research on ECT has never before been satisfactorily performed, and secondly, the public outcry against what seems, in the public mind, a primitive and even barbaric treatment.

In recent years, most authorities agree as to the effectiveness of electroconvulsive therapy in the treatment of severe endogenous depression and to its usefulness in the treatment of mania and schizophrenia.

Important studies, challenged the status of ECT and particularly, the paramount importance of the convulsions (Freeman et al. 1978); Johnstone; Deakin et al. 1980; Brandon, Cowley et al. 1984). It seems that seizure is a necessary component of the treatment, but it is undecided what constitutes an adequate duration of seizure activity.

The Royal College of Psychiatrists (1989), recommended that seizure of 25 seconds or more should be aimed for, that restimulation at a given period should be carried out if seizures of 15 seconds or less occur, or if there is no observable seizure or if there is unilateral or focal seizure.

Method: All ECT applications performed at Almana General Hospital, Damman, Kingdom of Saudi Arabia during the period from October 1992 to March 1995, were examined to ascertain what portion of the total, have seizures of duration less than 15 seconds, and to assess the reasons why those patients have fits of short duration. A bilateral induced fit for at least 15 seconds duration was the criterion determined to label an induced fit as adequate. Variables such as premedications, anaesthesia. muscle relaxation, electrode solution, as well as patient's age, sex, weight were examined. Therapeutic outcome for these groups of patients were looked at.

The study examined eighty cases with a total of 435 application, with I.C.D. 8 diagnosis of Affective Disorder (63 cases) and Schizophrenic disorder (17 cases). There were 23 females and 57 males. The diagnosis of Affective Disorder included: 52 cases of unipolar depression, 4 cases of bipolar depression, 5 cases of unipolar mania and 2 cases of bipolar mania.

Schizophrenic diagnosis included 10 cases of Paranoid Schizophrenia and 7 cases of Schizo- Affective Disorder (Schizo depression). In each case, the duration of bilateral clonic seizure is timed and examined by a consultant psychiatrist.

Age, sex, diagnosis, premedication, anaesthesia and muscle relaxant dosage, electrode solution, seizure response and duration in seconds and Hamilton depression scale score for appropriate case were recorded for all cases.

The outcome was categorized as follows:
a)Recovered and discharged from hospital within 7 days of last ECT application.
b) Marked improvement in symptoms recorded in case notes.
c) Some improvement in symptoms recorded in case notes.
d) ECT stopped due to lack of response.
e) ECT prematurely stopped because, of complications or for final reasons.

ECT Machine used was Duopulse Marked IV. The routine setting was ECT1 (180 milli coulombs) and ECT2 (228 milli coulombs).

All applications were by bilateral electrodes at a rate of 3 applications per week.

Results:

- The Hamilton Depression Score range was 21-34 with mean score of 29.63.
- The age range of the patients was 15-50 years. 7 cases were less than 21, 61 cases were between 22-40 and 21 cases were over 40.
- The average number of sessions per ECT course was 5.43. Out of 435 sessions, 95 sessions (22%) were inadequate (less than 15 seconds) of which 35 showed no fits. The remaining 340 sessions (78%) were adequate (over 15 seconds) of which 194 sessions (57%) were 15-25 seconds and 146 sessions (42%) over 25 seconds.

The case notes of the 95 cases in which there was an inadequate fits were examined:
With regard to anaesthesia, 37 cases (39%) received Propofol , 5 cases received Halothane and 53 cases (55.8%) received Thiopentone. There was positive correlation between patient's weight and Thiopentone dose (fig. 1). Their premedication was Benaodiazepines in 58%, Haloperidol in 25% and 17% has no premedication. Their electrode solution was bicarbonate 25% concentration in 15% and normal saline in 85%.

Examination of Regular Medication for the 35 cases with missed fir showed 68.5% received either Carbamezepie (28%) or both (8.5%). 45% of the Benaodiazepines group (5 cases) were on a high dose of Flunitrazpam (6-10 mg) per day. Seven sessions were 1st application in the ECT course. In one patient, 1st and 2nd sessions were missed fir then Carbamzepine was stopped, his 3rd session was of short duration and then subsequent sessions were of adequate duration. Another patient had missed fit in the 4th session due to increase in muscle relaxant dose. All five cases received Halothane anaesthesia due to difficult venopuncture had missed fit (including one case was not given muscle relaxant). One case had associated hypothyroidism (high T.S.H.).

The mean number of sessions in the inadequate duration group (95 sessions) was higher than the remaining group (62.5 sessions to 55.5 sessions). The mean seizure response was lower (1.21 to 3.17). The unexpected result was that the mean muscle relaxant dose was lower than the other group, probably due to low or no muscle relaxant in Halothane cases. The mean duration of induced seizure in this group was seven seconds.

Examination of Premeditation of the other groups showed that 46% received Benzodiazepines in (15-25 seconds group) and 30% in the (over 25 seconds group) while it was 58% in the (less than 15 seconds group).

I examined the case notes of those patients following the course of ECT and categorized their outcome as follows: (A) category 36 cases, (B) 27 cases, (C) 7 cases, (D) 2 cases and (E) 8 cases. Outcomes A and B were grouped together as Good Response and outcome C and D as Poor response.

In eight cases ECT sessions were stopped due to complications, early discharge, financial or other reasons. Those cases were eliminated from further study. 63 cases had a good response and 9 cases had a poor response.

There was a marked difference in the outcome depending on whether the course consisted of less than 4 adequate seizures or 4 ,or more adequate seizure.

N.S.	Good	Poor
4 or more	4	3
3 or less	18	6

Number induced seizure duration greater then 15 seconds

Patients who had 4 or more adequate seizures had better outcome. For the good response group, the majority of ECT sessions duration were between 15 and 35 seconds (see fig.2)

The mean seizure duration of (over 23 seconds) was estimated in both groups.

Anaesthesia

22.3% of sessions were given Propofol in the mean duration 16.6 seconds.

	Good	Poor
Mean seizure duration of over 23 seconds	89.9%	10.1

highly sig.

76.6% were given Thiopentone in the mean duration of 24.1 seconds. Therefore, Propofol reduced mean duration of seizure by 31% (highly sig.). Propofol reduced requirements of muscle relaxant (Sux) by 10.4%.

Mean Seizure Duration

1. In relation to outcome in each diagnotiz category, it is apparent that there is positive correlation between increase in seizure duration and good outcome.
2. In relation to number of sessions, there is positive correlation between the number of sessions and mean duration, i.e. increase no.s led to increase in mean duration up to the 7th session then there was progressive decreasing mean duration, more evident in cases of unipolar depression.
3. In relation to electrode solution, Bicarbonate 25% increased mean duration of seizure by 29% than normal saline.
4. There was negative correlation between duration of seizure and muscle relaxant dose (see fig. 3), negative correlation between the duration of seizure and number of sessions (see fig. 4) and positive correlation between duration of seizure and seizure response (see fig.5).

Number of sessions:

Cases of major depression required less number of sessions than manic and schizophrenic disorder. Schizo Affective Disorder cases required less N.S. (5.8) than schizophrenia (6.5 sessions). Therefore, probably the depression component in schizophrenic disorder reduced mean no.s required.

There was negative correlation between seizure response and number of sessions (see fig 6).

Discussion: Patients in the study suffered from a wide range of disorders, but the majority (52 cases) suffered from major depression.

The reliability of simple observation of clonic seizure duration is questionable as a reliable measure of seizure duration.

The Royal College of Psychiatrists in its publication on the practical administration of ECT (1989) recommends that simple observation is probably reliable in most cases.

Some cases with persistent violent seizure response were changed from Thiopentone to Propofol which was effective in reducing response, which is contrary to recommendations of some studies not to use Propofol in ECT (Simpson and Snaith 1989).

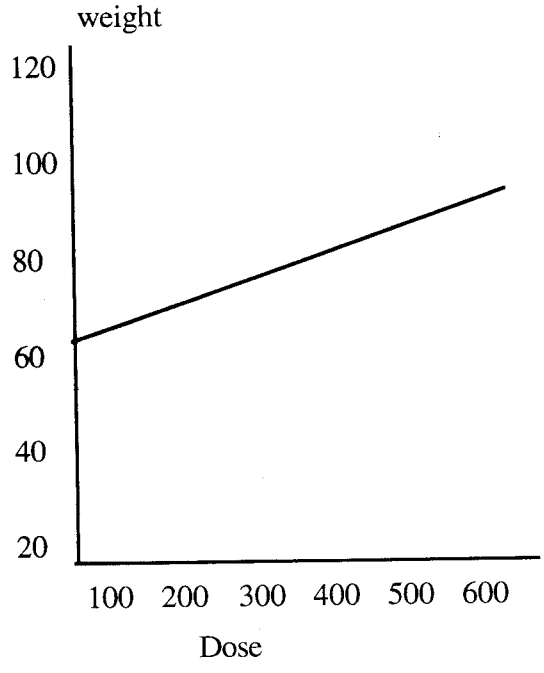

Fig. (1)
There is positive correlation between the weight of the patients and the dose of Thiopentone, i.e., increased weight led to increase dosag Thiopentonee

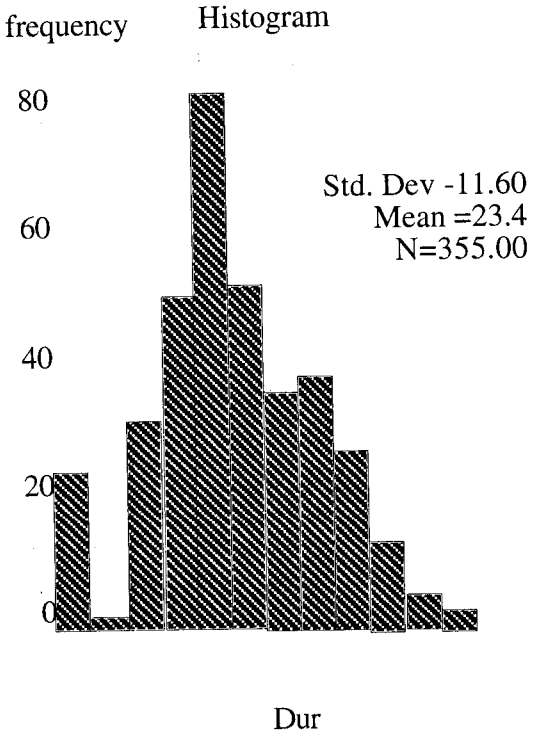

Fig. (2)
For the god responders group, the majority of ECT sessions duration were between 15 and 35 seconds.

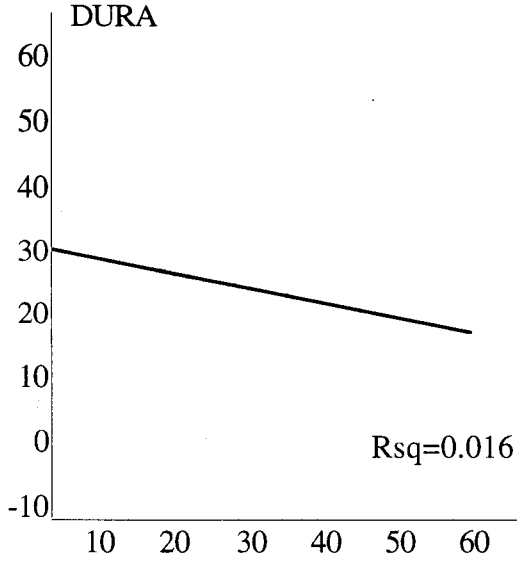

Fig. 3 There is negative correlation between muscle relaxant and duration, i.e. increased muscle relaxant dose led to decrease duration of seizure in the Thiopentone group.

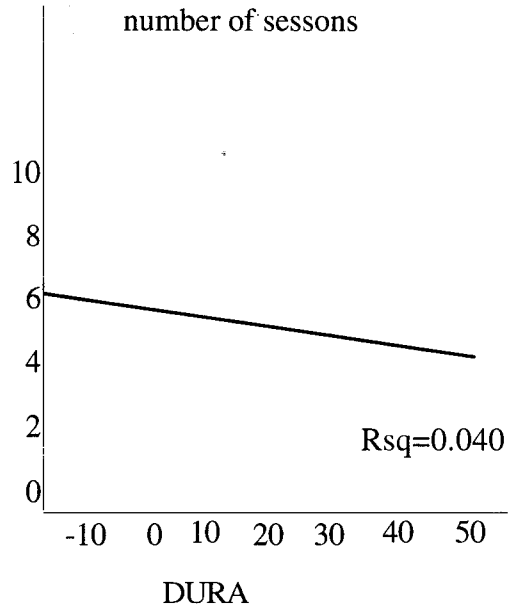

Fig. 4 There is negative correlation between the duration of seizure and number of sessions, i.e. increased duration led to decreased nnumber of sessions in unipolar depression group.

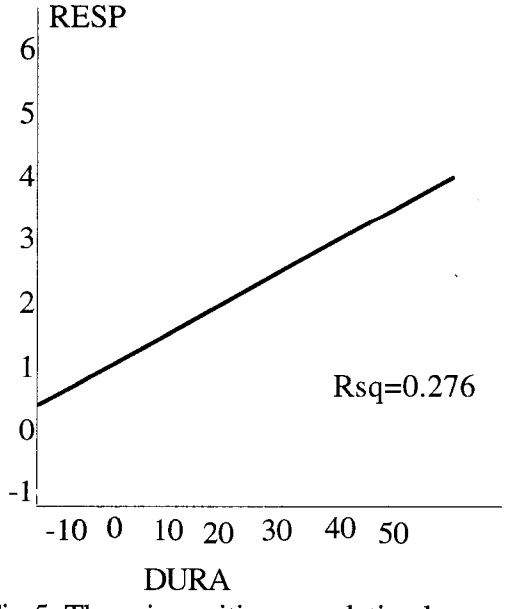

Fig.5 There is positive correlation between the duration of seizure and response,i.e. the stronger the response, the longer the duration.

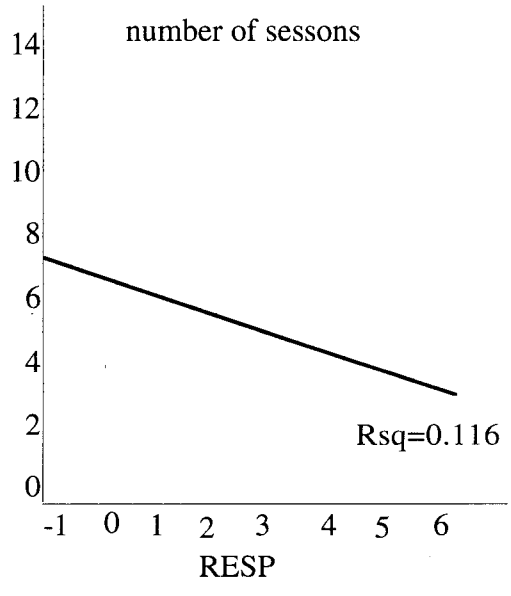

Fig. 6 Negative correlation between seizure response and number of sessions, i.e, increase in response led to decreased number of sessions in the Thiopentone group.

This is a prospective study but the scoring system for the outcome was devised later after knowing how many seizures of adequate duration each patient received before the outcome score was given.

Superficially, outcome results show a strong relationship between good response to ECT and having at least 4 or more induced seizures of at least 15 seconds duration each.

The most significant findings in the study were relationship between short duration induced seizure and concurrent administration of Benzodiapines and anticonvulsant therapy and the relationship between long duration of induced seizure and good clinical outcome.

Recommendations: 1. Psychiatrists should be fully aware of the implications of prescribing Benzodiazepines or Carbamezpine to patients' receiving ECT. 2. Anaesthetists should be aware of the shortening of duration of ECT seizure using Propofol OR missed seizure with Halothane.

Acknowledgment

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العلاقة ما بين الفترة الزمنية المناسبة و الاستجابة الفعلية للصدمات الكهربائية

تبحث هذه المقالة العلاقة ما بين الفترة الزمنية المناسبة و الاستجابة الفعلية الناتجة عن علاج المرضى بالصدمات الكهربية.

اشتملت هذه الدراسه على ٤٣٥ جلسة علاجية لثمانون حاله. منهم (ثلاثة و عشرون أنثى و سبعه و خمسون ذكر(موصوفون أكلبنبكبا طبقا للتقسيم الترقيمى الحديث (ICD 10)، ثلاثة و ستون حالة (اعتدال مزاج) و سبعة عشر حالة (فصام نفسى). أستعملت فيهاس الصدمات الكهربية عل كل من جانبى الرأس لمدة (خمسة عشر ثانية) أدت جميعا لحدوث استجابة تشنجية مناسبة و قد درست العوامل التى قد تؤثر على زمن التشنجات. و وجد أن أهم هذه الدلالات هى: العلاقة ما بين:

قصر فترة التشنجات مع تزامن أعطاء المريض لعقار بنزوديازبين كربانيرابين و بين فترة التشنجات و المحصلة الكلينيكية الجيدة.