CONTROLLED TRIAL OF STRAIGHT AND MODIFIED ELECTROPLEXY

By

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IN a previous paper (Seager, 1958) I described a retrospective examination of the records of patients who had been suffering from depressive illness and who had received electroplexy, with or without an anaesthetic or relaxant drug. The results of that survey suggested that patients who received unmodified E.C.T. were in hospital for a shorter period, received fewer treatments and were more likely to remain well than those treated with modified E.C.T. Recognizing that the method of retrospective evaluation could give rise to many errors which would affect the results, I have now carried out a controlled trial of these treatments. The aim of the trial was to ascertain any difference between the results of modified and unmodified electroplexy, and if so, to find out which factor or factors were responsible for the difference.

METHOD

A number of doctors in the hospital kindly agreed to co-operate in the trial. Once a doctor decided there was no reason why one of his patients should be restricted to a particular type of electrical treatment, the patient was allocated on a random basis to one of three groups. Any patient requiring electrical treatment was included in the allocation, but after the patient was discharged only those patients diagnosed as suffering from a depressive illness were assessed—thus all schizophrenic, schizo-affective and manic states were excluded. It was felt that in this way difficulties concerning change of diagnosis during the stay in hospital were minimized, though it resulted in groups being unequal in number.

The types of treatment given were unmodified E.C.T. and E.C.T. modified with thiopentone and suxethonium bromide as described in the previous paper, while a third group of patients received thiopentone 0·2 Gm. alone, prior to the E.T.C.

There was no set number of treatments, this being decided by the doctor in charge of the case according to his usual practice. On discharge, a final diagnosis was made, and the number of treatments noted, as well as the duration of the course of treatment and the period of convalescence. The clinical state of the patient on discharge was also noted, restricting assessment to the three standard terms Recovered, Relieved or Not Improved.

Patients were seen at the follow-up clinic or visited in their homes six months after discharge from hospital to assess progress.

Five categories were recognized:

(*a*) Symptom free—patient back at work or carrying out normal household duties.

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(*b*) Minor symptoms only—able to continue with usual occupation but requiring simple psychotherapy or symptomatic treatment from general practitioner or psychiatrist.

(*c*) Relapse—return of original symptoms but not to sufficient degree to require return to hospital—usually means patient is receiving out-patient electroplexy.

(*d*) Re-admission to hospital.

(*e*) Suicide.

Results

One hundred and seventy-three patients of varying diagnosis were included originally in the trial. Of these sixteen were withdrawn during the trial because the particular treatment proved unsuitable—the usual reasons were that patients receiving injections had poor veins or patients not receiving the relaxant drug developed back pain or bony injury.

A further 39 patients were withdrawn after completing the trial because the diagnosis was not that of depression. This left a total of 118 patients on which results are available. The grouping of the patients according to type of electroplexy is shown in Table I.

Table I

Number of Patients in Different Treatment Groups

	Unmodified E.C.T.	E.C.T. Modified by Thiopentone Alone	E.C.T. Modified by Thiopentone and Suxethonium	Total
Original number of patients in trial	54	49	70	173
Withdrawn during trial because of incomplete course	5	7	4	16
Withdrawn at end of trial because of diagnosis	14	15	10	39
Patients remaining in trial	35	27	56	118

The numbers of each diagnosis falling into the three treatment groups are shown in Table II.

Table II

Number of Patients in Each Diagnostic Group Receiving the Different Types of E.C.T.

Diagnosis	Treatment		
	Unmodified E.C.T.	E.C.T. with Thiopentone	E.C.T. with Thiopentone and Suxethonium
Manic depressive psychosis (depressive phase)	16	14	22
Involutional depression	4	5	8
Neurotic depression	15	8	26
Total	35	27	56

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The periods of time considered important were the duration of stay in hospital from the day of the first treatment, the duration of the course of treatment and the period of convalescence after the last treatment until discharge, as well as the total duration of stay in hospital. The average length of each period for each diagnostic group receiving the three types of treatment is shown in Tables III to VI.

TABLE III

Average Stay in Hospital from Day of 1st Treatment

	Unmodified	Modified by Pentothal	Modified by Thiopentone and Suxethonium
	Days	Days	Days
Manic depressive psychosis (depressive phase)	48·4	34·4	45·0
Involutional depression	35·5	22·6	39·6
Neurotic depression	48·4	40·6	48·9
All patients	46·9	30·6	46·1

TABLE IV

Average Number of Days Spent on Treatment

	Unmodified	Modified by Pentothal	Modified by Thiopentone and Suxethonium
	Days	Days	Days
Manic depressive psychosis (depressive phase)	30·3	16·7	21·0
Involutional depression	17·3	12·2	16·9
Neurotic depression	24·9	20·9	24·0
Total	26·5	17·1	21·8

TABLE V

Average Period of Convalescence in Hospital from Day of Last Treatment to Discharge

	Unmodified	Modified by Pentathol	Modified by Thiopentone and Suxethonium
	Days	Days	Days
Manic depressive psychosis (depressive phase)	17·8	17·6	23·2
Involutional depression	18·3	8·0	17·8
Neurotic depression	22·7	22·1	25·0
Total	19·9	17·2	23·3

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TABLE VI

Average Length of Stay in Hospital

	Unmodified	Modified by Pentothal	Modified by Thiopentone and Suxethonium
	Days	Days	Days
Manic depressive psychosis (depressive phase)	63·1	42·9	53·4
Involutional depression	44·8	40·6	46·3
Neurotic depression	68·3	55·8	63·6
Total	62·9	46·1	57·5

The average number of treatments received is shown in Table VII.

TABLE VII

Average Number of Treatments Received

	Unmodified	Modified by Pentothal	Modified by Thiopentone and Suxethonium
Manic depressive psychosis (depressive phase)	6·4	5·9	6·0
Involutional depression	5·8	4·4	5·9
Neurotic depression	6·1	5·9	6·6
Total	6·2	5·6	6·3

T-tests showed that there was no significant difference between the means of the groups, either in duration of hospital stay or number of treatments, though as will be seen on inspection there is a tendency for lower figures in the group of patients who received the anaesthetic alone.

Considering the state of the patient on discharge (Table VIII), the relationship between the three groups was examined by chi-square and it was found

TABLE VIII

Condition of Patients on Discharge from Hospital

	Unmodified E.C.T.			E.C.T. Modified with Thiopentone			E.C.T. Modified with Thiopentone and Suxethonium		
	Recovered	Relieved	Not Improved	Recovered	Relieved	Not Improved	Recovered	Relieved	Not Improved
Manic depressive psychosis (depressive phase) ..	6	10	0			0	13	9	0
Involutional depression ..	3	1	0	3			5	3	0
Neurotic depression ..	2	13	0	5	3	0	5	20	1
Total	11	24	0	16	10	1	23	32	1

that there was a significant difference between the three groups ($\chi^2=6\cdot0$, $P=0\cdot05$). To find out whether the three groups were significantly different from each other or paired in any way, chi-square tests were carried out on each result compared with each of the other two separately. It was found that there was no significant difference between the unmodified and fully modified E.C.T. ($\chi^2=1\cdot4$ and $P>0\cdot1$) or between the modified and the thiopentone alone group ($\chi^2=2\cdot4$, $P>0\cdot1$). Between the unmodified and the thiopentone modified treatment there was a significant difference ($\chi^2=4\cdot8$, $P<0\cdot05$).

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Refusal of Treatment

Once a patient had commenced his course of E.C.T. refusal of any particular treatment was noted. Patients who never embarked on the course were not included. This was because their refusal was based not on experience of the treatment, but on hearsay or else a general fear of electricity, anaesthetics or loss of consciousness, while here. I was trying to find out whether any particular method of administration was more frightening than another. Two patients in the unmodified, two in the thiopentone modified and three patients in the thiopentone and relaxant modified refused further treatment. There was, therefore, no indication of undue fear on the part of the patient of one or other type of treatment, at least as determined by the number of patients who refused further treatments. No account was taken of the degree of apprehension, or the amount of persuasion necessary to enable treatment to be given as these were not capable of objective evaluation.

Follow Up

Of 118 patients who were included in the trial, no information was available on fourteen of these after six months. The remaining patients were examined and the results are shown in Table IX.

Table IX

Condition of Patients Six Months After Discharge from Hospital

Unmodified E.C.T.

Diagnosis	Symptom Free	Minor Symptoms	Relieved	Re-admitted	Suicide
Manic depressive psychosis (depressive phase) ..	6	5	2	2	0
Involutional depression ..	1	3	0	1	0
Neurotic depression ..	2	7	2	1	0
Total	9	15	4	4	0

E.C.T. Modified with Thiopentone

Diagnosis	Symptom Free	Minor Symptoms	Relieved	Re-admitted	Suicide
Manic depressive psychosis (depressive phase) ..	3	7	1	2	0
Involutional depression ..	1	1	0	2	0
Neurotic depression ..	3	3	0	1	1
Total	7	11	1	5	1

E.C.T. Modified with Thiopentone and Suxethonium

Diagnosis	Symptom Free	Minor Symptoms	Relieved	Re-admitted	Suicide
Manic depressive psychosis (depressive phase] ..	11	5	1	4	0
Involutional depression ..	3	1	1	2	0
Neurotic depression ..	4	14	1	0	1
Total	18	20	3	6	1

For the sake of simplicity the follow-up results have been grouped into two; in the "improved" group are those patients who were symptom free or

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with minor symptoms only, and in the "relapsed" group those who required further electroplexy either on an out-patient or in-patient basis; also there were two suicides. Applying chi-square to these results, it is found that there is no significant difference between the follow-up results of the three forms of administering electroplexy ($\chi^2=0\cdot5$; $P>0\cdot5$).

Discussion

Barker (1959) has described the various methods of carrying out the common treatment of electroplexy in a number of British hospitals. He comments on the diversity of methods and points out how little we know of the advantages and disadvantages of them in terms of results and of complications.

There has recently been published a controlled trial of modified and unmodified electroplexy (Havens, 1958) which shows that the results of the two methods of treatment are similar, while the disadvantages of unmodified treatment—restlessness after treatment and high morbidity due to fractures—outweighs its advantages of simplicity and safety; this is particularly so as the hazards of modified electroplexy have been reduced by use of short-acting relaxant drugs.

This paper confirms the findings of Havens in so far as it shows that the results of treatment with unmodified E.C.T. and E.C.T. modified by an anaesthetic and relaxant are essentially similar in respect to number of treatments, length of stay in hospital, period of convalescence after treatment and condition at the time of discharge and after six months.

A third group of patients were included in the trial in order to try and demonstrate whether either the anaesthetic or relaxant drug were responsible for any differences between the two groups.

Observation of the results shows a tendency for patients who received thiopentone alone to have a better prognosis than the other two groups. This tendency does not reach a level of statistical significance; t-tests show no significant difference between the various means of the treatment groups, while chi-square tests of the follow-up results show that the differences found in the various treatment groups could well be explained on the basis of chance alone.

When one studies the state of the patients on discharge, however, one finds that there is a significant difference between the results of the thiopentone group and the unmodified electroplexy. The reason for this is not apparent. One must remember that all statistical examination tells one is that the likelihood of such an event taking place by chance is one in twenty; not that it can never take place, but that it is rare. This may be an explanation of this finding, or it may be due to an unexplained therapeutic benefit of thiopentone; this seems unlikely. Such a benefit would have to be much more apparent before this form of treatment could be recommended. It combines all the disadvantages of the other two forms—high morbidity due to back pain, risk of extravenous injection and other hazards of anaesthesia, without any concurrent advantages.

The finding that electroplexy, whether modified or unmodified, produces virtually identical results, confirms the view that its action is central and that such factors as the products of muscle metabolism are unlikely to play any part in its therapeutic action.

The decision as to whether modified or unmodified electroplexy should be administered is one which must be decided by the clinician who bases his decision on the available facts. He must take into account the undoubtedly

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higher morbidity of unmodified electroplexy and weigh this against the risks of anaesthesia, bearing in mind the experience of the person who is to administer the drugs and the nursing staff who must look after the patient after the treatment is given.

It is probably true that most psychiatrists now favour modified electroplexy as the method of choice but there are occasional indications for unmodified treatment, so that it would be unfortunate if it became established that failure to give modified treatment was negligence in law.

Summary

1. A controlled trial of electroplexy was carried out on 118 patients suffering from depressive illness. They were given treatment either unmodified, modified by thiopentone alone, or by thiopentone and suxethonium bromide.

2. There was no significant difference in number of treatments, length of stay in hospital, clinical outcome or follow-up after six months between the unmodified electroplexy and that modified by anaesthetic and relaxant drugs.

3. Comment is made on the improved results produced in patients receiving thiopentone alone prior to treatment.

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