

Issues in the Assessment of Post-ECT Memory Changes

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In this study memory changes during and after electroconvulsive therapy were investigated by means of three different tests. The investigation was double-blind and the subjects were 96 patients hospitalized with depressive illness. Amounts of post-ECT amnesia were evaluated in relation to number of treatments for symptom remission and stability of the therapeutic result over the period of one year.

METHOD

The number of treatments for remission ranged from 4 to 12, with a mean of 7.8. With patients classified by number of treatments given, this resulted in five groups termed the 4, 6, 8, 10 and 12 ECT groups respectively. The 87 patients testable prior to ECT were retested 36 hours after every second treatment of their individual series, and 10 days after the conclusion of the series. The Benton (1) and Paired Associates (PA) tests, measuring anterograde amnesia, were readministered one year later to 33 of the 56 patients who had an interim stable remission (2). A Personal Data Sheet (PDS), based on the patient's pre-treatment recall of 50 items of personal information, was devised to measure retrograde amnesia.

RESULTS AND DISCUSSION

There were marked individual differences in the extent of post-treatment amnesias. Nevertheless, the groups with 4 to 10 treatments averaged at symptom remission equal amounts of impairment on PA. On the PDS, there was approximately the same degree of loss at equivalent stages of the treatment course (Fig. 1). On both tests, memory losses from pre-treatment to post-treatment were significant at the one per cent level. Benton changes over the same time interval were minimal. Significant gains occurred on all three tests during the 10 day post-treatment period. There was no correlation between length of treatment and amounts of memory loss.

The 12 ECT group had no observable memory changes after the fourth treatment, and post-treatment gains were minimal; yet this group did not differ from the rest of the sample in age and relapse rate. In view of this unexpected result, each member of the 12 ECT group was matched on the basis of relevant variables with a corresponding patient drawn from the 8 or 10 ECT groups.

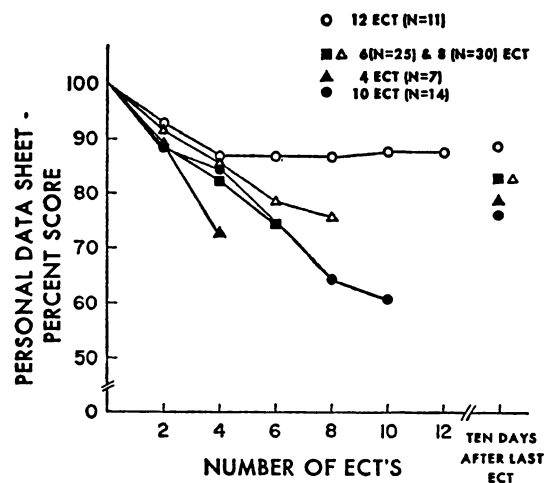


FIG. 1

The 12 ECT patients differed from their matched controls in showing less change with treatment both on memory scores and on the Clyde Mood Self-Rating 'Unhappy' score (3). Atypical subgroups of this nature may have escaped notice in other studies of post-ECT amnesias because the number of treatments given for symptom remission was not included as a variable.

Pre-treatment memory scores failed to discriminate between the stable remission and the relapsed patient groups. Absence of post-treatment memory deficits did not rule out the possibility of a stable remission over the year. However, of the 11 patients with no memory loss on both the PA and PDS, 6 (55 per cent) relapsed over the year, as contrasted with 3 out of the 14 patients (21 per cent) who had above average loss on both measures. The relapse rate for the total followed-up sample was 38 per cent. Similar trends, but with focus on the immediate therapeutic result, have been reported in one other study (4) in which memory testing was done about 36 hours after treatment. No relationship between therapeutic result and memory loss has been reported (5) when memory tests were given after intervals in excess of 36 hours post-ECT. A partial reversal of memory loss could be anticipated when there is a more prolonged interval between the last treatment and test administration.

On one year post-treatment retests, the non-relapsing patients showed significant Benton and PA gains over pre-treatment and 36 hours post-ECT scores. On the PA, there were also significant gains over the 10 day post-treatment level. Retest correlation coefficients of Benton and of PA scores ranged from .264 to .869. The lowest correlations occurred on both tests when pre-treatment scores were one of the two variables. This may be due to the effects of the pre-treatment lack of practice in test taking, to impaired learning efficiency associated with depression, and to the subsequent disruptive effects of the somatic treatments. The highest correlations (Benton $r = .869$; PA $r = .707$) were between 10 days and one year post-treatment scores. They suggest increased stability in the memory test functioning of remitted patients.

Objective tests for investigating post-ECT memory changes have been heretofore chiefly of the laboratory type. The Benton and PA are tests of this nature. They provide for a two-stage process of memorizing material, followed by measurement of amounts retained. The PDS involves a one-stage process demanding a post-treatment retrieval of personal information acquired prior to hospitalization. The degree of association between post-ECT memory deficits shown on tests of artificial learning and the amounts of loss of information relevant to the patient's everyday living has not been previously explored.

The correlation between pre-treatment Benton and PA scores was .606. The intercorrelations of score changes on the three tests from pre-treatment to 36 hours after treatment, and from 36 hours to 10 days after termination of treatment ranged from .175 to .457. These coefficients signify a limited equivalence among amounts of memory changes as reflected on each of the three tests. Results from the PA and the PDS were not directly comparable, as the two tests measured anterograde and retrograde amnesias respectively. Still, it is noteworthy that the PDS showed more deficits with treatment and slower post-ECT recovery than the PA. On the PDS, impaired retention persisted after treatment even among patients strongly motivated to regain normal functioning.

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SUMMARY

Except for the performance of the deviant 12 ECT group, memory changes during and after ECT on PA and on the PDS showed similar patterns of loss during treatment and of post-treatment gains. Benton scores were not significantly changed with treatment but showed improvement after remission. Patients with no post-treatment memory deficits had a higher relapse rate during the year than the rest of the sample. Amounts of memory change, as documented on any one of the three tests, had limited comparability with results from either of the other two tests. An objective measure devised to sample post-treatment retention of personal information showed more impairment and a slower recovery rate than the two tests of anterograde amnesia which involved artificial types of learning.

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REFERENCES

1. BENTON, A. L. (1963). *The Revised Visual Retention Test*. Psychological Corporation, New York.
2. BIDDER, T. G., STRAIN, J. J., and BRUNSCHWIG, L. 'Bilateral and unilateral ECT: Follow-up study and critique.' *American Journal of Psychiatry*. In Press.
3. CLYDE, D. J. (1963). *Manual for the Clyde Mood Scale*. Biometric Laboratory, University of Miami, Florida.
4. KORIN, H., FINK, M., and KWALWASSER, S. (1956). 'Relation of changes in memory and learning to improvement in electro shock.' *Confinia Neurologica*, 16, 88-96.
5. OTTOSSON, J.-O. (1967). 'Memory disturbance after ECT—a major or minor side effect?' *Proceedings of the First International Congress of the Academy of Psychosomatic Medicine*. International Congress Series no. 134, Excerpta Medica Foundation, 161-8.