Predictors of Response to Electroconvulsive Therapy in Major Depressive Disorder

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Introduction

In recent years, electroconvulsive therapy (ECT) has increasingly been reserved for moderate to severe depressions that have often been resistant to drug therapy or have had favorable response to ECT in the past. This selection process may modify the usefulness of clinical "predictors" of treatment outcome (Hobson 1953; Roberts 1959; Hamilton and White 1960; Ottosson 1962; Hordern et al. 1963; Nystrom 1964; Carney et al. 1965; Mendels 1965; Perris 1966; Carney and Sheffield 1972), which were identified when ECT was used more liberally. Indeed, several subsequent studies have failed to identify any predictors of response to ECT (Abrams et al. 1973; Abrams 1982; Katona and Aldridge 1984), suggesting that selection of patients on the basis of a valid categorical diagnosis of depression abolishes the predictive value of individual clinical features.

However, as not all depressed patients treated with ECT respond equally, it is reasonable to continue the search for factors likely to predict response to treatment. The present study was undertaken to address this question.

Methods

The sample consisted of 48 psychiatric inpatients (13 men, 35 women; mean age 61 years) who were diagnosed as having major depressive disorder (MDD) by Research Diagnostic Criteria (Spitzer et al. 1975) and having a 17-item Hamilton Rating Scale for Depression (HRSD) (Hamilton 1960) score of 20 or more at the pre-ECT evaluation. Patients who required less than five ECTs during the course of treatment were excluded.

A sine wave MEDCRAFT machine was used to give ECT three times a week, following subject screening with routine laboratory tests, spinal films, electrocardiogram, and specialist consultation with cardiology and anesthesia. Glycopyrrolate, 0.1–0.2 mg im, was used as premedication. Anesthesia was induced with methohexital, 1 mg/kg of body weight, and muscle relaxation with succinylcholine, 0.75 mg/kg of body weight. Voltage and duration, electrode placement, and total number of treatments given were determined by the primary clinician. Generally, energy settings ranged between 100 and 160 V (mean ± SD 139.5 ± 14.4) and 0.5–1.0 sec (mean ± SD 0.8 ± 0.1), respectively, and were adjusted to achieve a seizure duration (monitored by the "cuff method") of 25 sec or more. Shorter seizures were followed by restimulation at a higher energy level. Total number

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of treatments ranged between 5 and 12. No formal attempt was made to control the endpoint of ECT, which followed clinical judgments.

Results

At the end of ECT, patients were grouped as good responders (HRSD <10) n = 29 (60.4%) and poor responders (HRSD ≥ 10) n = 19 (39.6%). Good responders had significantly lower post-ECT mean ± SD total HRSD scores (5.5 ± 3.0) than the poor responders (17.6 ± 6.0) ($p < 0.0001$). Poor response was not related to inadequate treatment, as indicated by higher voltage (143.7 ± 15.1 versus 136.8 ± 13.5 V, NS) and current duration (0.85 ± 0.1 versus 0.75 ± 0.1 sec, $p < 0.02$) in favor of the poor responders. Also, poor responders had significantly more ECTs (8.52 ± 2.2) and longer cumulative seizure time (431.1 ± 210.7 sec) than good responders (6.89 ± 2.8, 318.3 ± 131.5 sec) ($p < 0.05$). Comparisons for the pre-ECT RDC variables, the total HRSD score, and the items of the HRSD across these two groups revealed significant differences on a few variables (Table 1).

Among the RDC items, agitation was significantly more frequent in the poor responders. Mean total HRSD and certain HRSD item scores (depressed mood, work and interest, agitation, somatic anxiety, and gastrointestinal symptoms) were also significantly higher in the poor responders. Most items from the RDC (including retardation, psychosis, endogeneity, distinct quality of mood, loss of reactivity, past or family history of depression, length of depressive episode, bipolarity, previous history of ECT, and so on) were not significantly different between the two groups.

Discussion

Our finding that patients with the higher initial HRSD scores did less well at the end of ECT runs contrary to traditional clinical wisdom, but is in agreement with the findings of Katona and Aldridge (1984), who offered the explanation that there may be a subgroup of patients who received ECT for acute exacerbation of a chronic depression and only had partial recovery. Similarly, Coryell and Zimmerman (1984) found the presence of melancholia (defined by DSM-III) to predict higher symptom scores during the post-ECT follow-up period. An alternative explanation may be that even if the rate of remission of symptoms in all patients receiving ECT were identical, those with the highest initial HRSD scores may take longer to come down to 10 or less. Therefore, the time at which the outcome assessment is made may influence assignment to response categories. Conceivably, many "poor responders" may be seen to improve if followed up longer after the end of ECT. We intend to study this in a larger sample.

Table 1. Clinical Predictors of Response to ECT

	Good responder (n = 29)	Poor responder (n = 19)	p Value
RDC variables			
Agitation: Absent	18	4	
Present	11	15	0.005[a]
Total HRSD (mean ± SD)	25.2 ± 8.1	30.9 ± 5.3	0.01
HRSD items			
Depressed mood	2.95 ± 1.1	3.55 ± 0.6	0.05
Work and interest	2.59 ± 1.1	3.24 ± 0.6	0.03
Agitation	1.28 ± 1.1	2.05 ± 1.1	0.03
Somatic anxiety	1.07 ± 1.2	1.82 ± 1.2	0.05
Gastrointestinal	0.89 ± 0.6	1.42 ± 0.6	0.01

Two-tailed t-tests except [a]which were 2 × 2 chi-squared tests.

Our failure to verify the traditional predictors of ECT response using RDC diagnosed MDD patients with moderate to severe depression validates similar reports by Abrams' group. Abrams et al. (1973) were unable to confirm the predictive indices of Hobson (1953), Carney et al. (1965), and Mendels (1965) in primary depressive inpatients. In a subsequent reanalysis of this and other data on endogenous depressives treated with ECT, only one item (gastrointestinal symptoms) was significantly correlated with outcome and could be attributed to chance (Abrams 1982). According to Abrams (1982), a valid categorical diagnosis of endogenous depression leaves insufficient variability in the clinical picture to permit prediction of outcome. The frequent recommendations (Ottosson 1981; Fink 1982) that a diagnosis of depression be used to select patients for ECT may be based on similar experience.

A few individual symptoms that were significantly different in our two response categories perhaps only attest to the greater severity of depression in the poor responders, and we would be very cautious in attributing a predictive value to them without replication using similar methodology. In conclusion then, we have confirmed that when ECT subjects are selected on the basis of illness severity and a valid diagnosis of MDD, individual clinical features probably have little further predictive value. Moreover, the most severely depressed patients have a poorer response, at least in the early phase after ECT.

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