

JAD 00722

Electroconvulsive therapy in delusional and non-delusional depressive disorder *

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(Received 26 September 1989)

(Accepted 25 January 1990)

Summary

Major depressive disorder (MDD) patients ($n = 66$) treated with electroconvulsive therapy were stratified by the presence ($n = 30$) or absence ($n = 36$) of delusional symptoms (by Research Diagnostic Criteria) to compare their response to treatment. At discharge from hospital 83% of the MDD with psychosis group and 58% of the MDD without psychosis group were good responders ($P = 0.03$). The implications of this are discussed.

Key words: Electroconvulsive therapy; Delusional depression; Major depression; Psychotic depression; Predictors of response

Introduction

In an earlier study of the predictors of response to electroconvulsive therapy (ECT) (Pande et al., 1988) we confirmed the suggestion (Abrams, 1982) that a diagnosis of major depressive disorder (MDD) of at least moderate severity leaves insufficient variability in the symptom picture to allow

identification of clinical features predictive of a differential treatment response. Even delusional symptoms were not found in our study to be a predictor of response which is contrary to the earlier literature (Crow and Johnstone, 1986) supporting the presence of psychosis as a favorable predictor of ECT response. Since formalized diagnostic systems have come into greater clinical use, two small studies (Rich et al., 1986; Solan et al., 1988) comparing ECT response rates between delusional depression and non-delusional depression have reported no differences. Rich et al. studied 30 depressed patients (nine delusional and 21 non-delusional) and found equal rates of response. Solan et al. reviewed 46 pharmacotherapy-resistant depressives who received ECT and found that delusionals and non-delusionals responded

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* Presented as a poster at the Society of Biological Psychiatry Annual Meeting, San Francisco, CA, May 1989.

equally well. Among the delusional depressives, response to ECT was affected by the type of delusions. Patients with nihilistic delusions did better than those with paranoid delusions.

Since, at least on a phenomenologic basis, the distinction between delusional and non-delusional depression seems rather clear, we were prompted to re-examine the question of differential response to ECT in a sample larger than our previous study. Furthermore we examined the effect of electrode placement on the response to ECT in the two groups of subjects as well since it has been suggested that it is preferable to treat delusional MDD with bilateral ECT (Abrams, 1988) despite the risk of more cognitive impairment.

Method

The sample was drawn from the database of the Depression Program of the University of Michigan Medical Center. Diagnosis by the Research Diagnostic Criteria (RDC; Spitzer et al., 1978), clinical ratings and ECT parameters (machine, energy settings, seizure duration, etc.) are routinely collected on patients treated with ECT and are entered into the computerized database. Diagnostic data are obtained through a structured interview – the Schedule for Affective Disorders and Schizophrenia (SADS) – and/or by clinical interviews by at least two clinicians who use the RDC rules to reach a consensus diagnosis. This also includes consensus on the presence or absence of psychotic and endogenous RDC subtypes. Clinical ratings consist of the Hamilton Rating Scale for Depression (HRSD) and the Global Assessment Scale (GAS) which are conducted by the primary clinicians and are, therefore, not ‘blind’ to the treatment status. The Depression Program periodically conducts interrater reliability training sessions for all clinicians to ensure consistency of ratings.

The present sample is a subset of the above database and consisted of 66 inpatients (including 48 subjects already reported on by Pande et al., 1988) with a diagnosis of major depressive disorder by the RDC and treated with ECT through the Electroconvulsive Therapy Program of the University of Michigan Medical Center. Only those patients who required at least five ECTs in a

course of treatment were included. Thirty patients had psychotic symptoms by RDC and 36 did not. Clinical status was rated prior to commencement of ECT on the 17-item HRSD (Hamilton, 1960) and this rating was repeated within a week of ending ECT and at the time of discharge from the hospital. The Global Assessment Scale (GAS) was also collected before and after ECT.

A sine wave MEDCRAFT or a pulse wave MECTA SR-2 machine was used to give ECT three times a week following patient screening with routine laboratory tests, spinal films, electrocardiogram, and specialist consultation with cardiology and anesthesia. Glycopyrrolate 0.1–0.2 mg i.m. was used as premedication when indicated. Anesthesia was induced with methohexital 1 mg/kg body weight and muscle relaxation with succinylcholine 0.75 mg/kg body weight. Voltage and duration, electrode placement (unilateral d’Elia or bitemporal), and total number of treatments given were determined by the primary clinician. Generally, the settings for the MEDCRAFT machine were 100–160 V and 0.5–1.0 s, while for the MECTA the energy levels ranged between 30 and 90 J. The machines were adjusted to achieve a seizure duration (monitored by the ‘cuff method’) of 25 s or more. Shorter seizures were followed by re-stimulation at a higher energy level. Total number of treatments ranged between 5 and 17 (mean \pm SD = 9.3 ± 2.4). No formal attempt was made to control the end point of ECT which followed clinical judgements.

Results

The demographic and clinical variables of the two subgroups are shown in Table 1. The sex distribution was similar in the subgroups but the delusional MDD patients were significantly younger ($P < 0.02$) although neither the age of onset of the first depressive episode nor the number of previous episodes was different between the groups. The delusionals had a significantly shorter hospital stay ($P < 0.04$) but this was accounted for by the non-delusionals having been in hospital longer before ($P < 0.005$) the start of ECT. Hospital stay after the first ECT was identical for both groups.

TABLE 1
SAMPLE CHARACTERISTICS AND ECT PARAMETERS

	MDD – delusional (<i>n</i> = 30)	MDD – non-delusional (<i>n</i> = 36)
Sex (M:F)	8:22	11:25
Age		
At first episode	44.2 ± 19.9	47.0 ± 18.2
At present ^a	58.3 ± 14.9	65.9 ± 10.8
Number of episodes	2.1 ± 2.7	3.1 ± 2.9
Length of hospital stay ^a	64.0 ± 25	80.0 ± 33
Before first ECT ^b	15.2 ± 12.9	31.4 ± 27.3
After first ECT	48.5 ± 25.2	48.5 ± 16.9
Electrode placement		
Unilateral (UL)	17	18
Bilateral (BL)	11	11
Switched (SW) (UL to BL)	2	7
Number of ECTs	8.9 ± 2.9	9.5 ± 2.1
Total seizure duration (mean ± SD, s)	407.3 ± 208.9	415.2 ± 176.9

^a *P* < 0.04; ^b *P* < 0.005.

The mean number of ECTs and the cumulative seizure duration for the course of ECT did not differ, suggesting that both groups received equal amounts of treatment. Electrode placement, categorized as bilateral (BL), unilateral (UL) and unilateral to bilateral switch (SW), did not differ significantly between the delusional and non-delusional groups. Number of treatments between UL and BL + SW did not differ (9.5 ± 2.9 vs. 9.2 ± 2.4 , $t = 0.49$, $P = \text{NS}$) in the total sample. In the non-delusional group, the UL patients received 8.7 ± 2.1 ECTs versus 10.2 ± 2.0 in the BL + SW ($P < 0.05$) but the difference was not significant when the two patients who received 14 ECTs (i.e., more than 2 standard deviations above the mean ECTs for the sample) were excluded from the BL + SW group. Similarly, in the delusional group, the UL patients received 10.3 ± 3.4 ECTs against 7.6 ± 2.1 in the BL + SW. This difference was significant ($P < 0.05$) but when the UL patients who received over 14 ECTs were excluded, there was no statistical difference.

Baseline, i.e., pre-ECT, mean HRSD scores were similar in the groups (Table 2) but a repeated measures ANOVA for the mean HRSD scores pre ECT, post ECT and at discharge grouped by the

delusional–non-delusional distinction showed a significant group by time interaction in favor of the delusional MDD group. Similarly the repeated measures ANOVA for the mean GAS scores pre ECT and post ECT revealed a significant group by time interaction. The total HRSD scores were used to categorize patients as responders or non-responders based on a total 17-item HRSD of 10 points. Good responders (defined as an HRSD of 10 or less) as compared to poor responders (HRSD ≥ 11) had a greater mean decrease in HRSD score at the post-ECT (75% vs. 44%, $t = 5.5$, $P = 0.0001$) as well as the discharge (78% vs. 50%, $t = 7.5$, $P = 0.0001$) ratings. The post-ECT rate of good treatment response was higher in the delusional (21/30, 70%) than the non-delusional group (17/36, 47%) ($\chi^2 = 3.5$, $df = 1$, $P = 0.06$). This significant trend became stronger at the time of discharge when 25/30 (83%) delusional and 21/36 (58%) non-delusional patients were categorized as responders ($\chi^2 = 4.84$, $df = 1$, $P = 0.03$). Since it was possible that the non-delusionals may have included an excess of non-endogenous depressives, we cross-categorized the endogenous and psychotic RDC subtypes. Of the delusional MDD group 28/30 (93%) met the endogenous subtype as compared to 30/36 (83%) of the non-delusional group ($\chi^2 = 1.5$, $df = 1$, NS). Thus, poorer response in

TABLE 2
PSYCHOSIS AND RESPONSE TO ECT

	MDD – delusional (<i>n</i> = 30)	MDD – non-delusional (<i>n</i> = 36)
HRSD (mean ± SD) ^a		
Pre ECT	28.4 ± 6.3	26.5 ± 6.0
Post ECT	9.5 ± 6.7	11.1 ± 6.4
At discharge	7.5 ± 6.4	9.3 ± 5.7
GAS (mean ± SD) ^b		
Pre ECT	30.5 ± 9.9	37.4 ± 12.9
Post ECT	60.8 ± 16.9	56.4 ± 20.8
Response rate (patients with HRSD ≤ 10)		
Post ECT ^c	21/30 (70%)	17/36 (47%)
At discharge ^d	25/30 (83%)	21/36 (58%)

^a Repeated measures ANOVA, $F = 4.21$, $df = 2$, $P < 0.02$.

^b Repeated measures ANOVA, $F = 5.98$, $df = 1$, $P < 0.02$.

^c $\chi^2 = 3.5$, $df = 1$, $P = 0.06$.

^d $\chi^2 = 4.84$, $df = 1$, $P = 0.03$.

TABLE 3
PSYCHOSIS, ELECTRODE PLACEMENT AND RESPONSE TO ECT

	MDD – delusional			MDD – non-delusional		
	UL (<i>n</i> = 17)	BL (<i>n</i> = 11)	SW (<i>n</i> = 2)	UL (<i>n</i> = 18)	BL (<i>n</i> = 11)	SW (<i>n</i> = 7)
Post ECT	9 (53%)	11 (100%)	1 (50%)	6 (33%)	8 (73%)	3 (43%)
At discharge	13 (76%)	11 (100%)	1 (50%)	8 (44%)	9 (82%)	4 (57%)

All NS.

the non-delusionals could not be attributed to the lack of 'endogenous' features.

At the post-ECT rating 23 of 31 (74%) patients treated with bilateral ECT or switched from unilateral to bilateral ECT were responders as compared to 15 of 35 (43%) treated with unilateral ECT ($\chi^2 = 6.61$, $df = 1$, $P = 0.01$). The difference was not as significant at the time of discharge when 25/31 (81%) bilaterals and switched were responders as compared to 21/35 (60%) unilaterals. Table 3 shows the rates of response in the delusional and non-delusional groups stratified by the electrode placement. Although delusionals receiving bilateral ECT were more likely to be responders the differences were not statistically significant.

Discussion

This study found that in depressed inpatients with a comparable severity of illness prior to treatment, there was a significant trend toward the delusional depressives having a higher rate of response than non-delusional depressives with ECT at the end of treatment. This difference became statistically significant at the time of discharge. It has been suggested that bilateral ECT may be preferable in delusional MDD (Abrams, 1988), hence we examined whether electrode placement affected response. The frequency with which unilateral and bilateral electrode placement was used in the delusional and non-delusional groups was similar. Overall, bilateral ECT was significantly more likely to be associated with a response at the end of ECT than unilateral ECT. This difference was not significant at discharge and may indicate

that the electrode placement influences the speed of response. All of the delusional depressives treated with bilateral ECT were responders at the end of treatment and at discharge whereas among those treated with unilateral ECT only half were responders post ECT and about three-quarters at discharge. These differences failed to reach statistical significance. In the non-delusional patients as well treatment response was better in those receiving bilateral ECT but the difference was not as great as in the delusional MDD patients. The efficacy of bilateral ECT was not significantly different between the delusional and non-delusional groups, nor was the efficacy of unilateral ECT different between the groups.

The demographic and treatment response differences between the delusional and non-delusional depressives suggest that they may represent overlapping but distinct populations, which arrive at ECT for different reasons. As there were no significant differences in the pretreatment severity of depression, it is possible that delusional depression may not be just a more severe form of depressive illness on a continuum with non-delusional depression. This possibility deserves further study. The clinical selection process as a source of bias also needs to be considered in that while the delusional depressives may receive ECT as a treatment of first choice, the non-delusional depressives often arrive at ECT after having failed to respond to pharmacotherapy. This would account for the longer hospital stay and may mean that this group represents a more chronic or treatment-refractory form of depressive illness. We could not analyze our sample to identify how many may have been referred for refractory depression as

opposed to those who received ECT because they were severely ill. We believe such analysis in future prospective studies would be valuable.

Despite the retrospective nature of this study, the findings provide further encouragement to conduct prospective studies using random assignment of delusional and non-delusional depressives to unilateral and bilateral ECT so as to elucidate the role of delusional symptoms and electrode placement in the response to ECT.

Acknowledgements

Supported in part by NIMH Grant RO1 MH40216 and the University of Michigan Department of Psychiatry.

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