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Effectiveness of Electroconvulsive Therapy in Patients With Major Depressive Disorder and Comorbid Borderline Personality Disorder

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Abstract

Objective: Previous research suggests that electroconvulsive therapy (ECT)—the criterion standard for the treatment of severe depression—is not as effective when the patient has comorbid borderline personality disorder (BPD). The ECT outcomes of patients with and without BPD were compared in a retrospective chart review to test this claim.

Methods: We enrolled 137 patients with a diagnosis of major depressive disorder who completed the McLean Screening Instrument for Borderline Personality Disorder. Twenty-nine patients had positive screening scores for BPD. The difference in Patient Health Questionnaire (PHQ-9) scores before and after ECT was compared between patients with and without BPD. Follow-up PHQ-9 scores determined after treatment were collected and analyzed.

Results: ECT equally improved symptoms of depression as measured by PHQ-9 score in both patients who screened positive and patients who screened negative for BPD. No difference in the increase in PHQ-9 scores between these 2 groups was noted 1 month after treatment ($P=.19$).

Conclusions: These data showed that a positive BPD screen does not necessarily predict a poorer response to ECT, nor does it predict greater symptom recurrence after ECT. This does not suggest that ECT is necessarily an appropriate treatment for MDD in patients with a comorbid BPD, given the limitations of screening instruments.

Keywords

borderline personality disorder; depression; electroconvulsive therapy

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Conflicts of Interest

Introduction

Personality disorders commonly coexist with mood disorders and complicate treatment for these patients. World Health Organization World Mental Health Surveys showed that patients with personality disorders are 6.5 times more likely to have a comorbid mood disorder,¹ and the general consensus is that the presence of a personality disorder negatively impacts the outcomes of persons with mood disorders who do or do not receive treatment.² For patients specifically with major depressive disorder (MDD), depressive symptom remission strongly increases with the absence of a personality disorder³ and the duration from diagnosis of MDD to remission is longer for patients with personality disorders.⁴

Specifically, the interactions between borderline personality disorder (BPD) and MDD have gained attention because of their prevalence, persistence, and resistance to treatment. Stressors associated with BPD—eg, chaotic relationships, frequent crises—may increase the severity and duration of MDD.⁵ Furthermore, the neurobiologic aspects of BPD, including heightened amygdala response,⁶ serotonergic abnormalities,⁷ and limited cortical inhibition,⁸ may parallel the neurobiologic changes of MDD and could function as a predisposing factor for depressive symptoms.

As many as 85% of patients with BPD meet the criteria for MDD,⁹ and a diagnosis of BPD is a stronger predictor of MDD persistence than any other risk factor, including a family history of depression, female sex, and other concurrent psychiatric disorders.¹⁰ BPD is also a stronger predictor of MDD than other personality disorders such as avoidant and paranoid disorders.¹¹

Patients with MDD and comorbid BPD have dramatically lower rates of depression remission (30% by the first year) than patients with only MDD (80%),¹² and they do not respond as well to antidepressants such as selective serotonin reuptake inhibitors^{13,14} and tricyclic antidepressant medication.¹⁵ Patients with BPD tend to over-endorse their depressive symptoms,¹⁶ and these depressive symptoms typically do not improve without first addressing the underlying personality disorder.^{12,17}

For especially severe, medication-resistant episodes of MDD, electroconvulsive therapy (ECT) is a highly effective treatment with rates of remission or marked improvement as great as 75%.¹⁸ Although reserved for patients with severe depression, ECT's effectiveness and quick turnaround time have made it an invaluable resource for the psychiatric treatment of MDD. After approximately 3 to 4 weeks of treatment, most patients with depression are able to reach the levels of functioning they had before the onset of depression, even in the presence of suicidal or psychotic features.¹⁹

Despite its effectiveness, the benefits of ECT are less pronounced when a patient also has a comorbid personality disorder. Sareen et al²⁰ concluded that patients with a cluster B personality disorder had a significantly poorer response to ECT than those without a personality disorder. Another study²¹ showed that ECT has greater rates of success for patients with other personality disorders, including the other 3 disorders in cluster B

(antisocial, histrionic, narcissistic personality disorders), than patients with BPD, thereby signifying a specific difficulty for ECT in patients who have BPD.

Findings, however, are not fully consistent. Casey et al²² found that patients with BPD had an equal speed and degree of response to ECT as patients without a personality disorder. A literature review conducted by DeBattista and Mueller²³ presented conflicting results concerning whether patients with both MDD and BPD had less improvement in depressive symptoms after ECT treatment than patients without a comorbid personality disorder, but they ultimately concluded that depression in patients with BPD can be effectively treated with ECT.

Although the positive effects of ECT in patients with depression are well documented, the literature about administering ECT to patients with depression and BPD is inconclusive because of conflicting results, methodological deficiencies in these studies, and a generally small number of enrolled patients.²³ By enrolling a relatively large cohort of patients at Mayo Clinic, this study aimed to reexamine the short- and long-term effects of ECT treatment for patients with depression and BPD.

Methods

The Mayo Clinic Institutional Review Board approved this study and waived written informed consent for those who provided research authorization. We performed a retrospective review of electronic health records, specifically of adult inpatients (age range, 18–65 years) in the Mood Disorders Unit who were treated for severe primary unipolar depression with ECT at Mayo Clinic from December 1, 2013, through January 31, 2017. All patients treated with ECT were routinely administered the Patient Health Questionnaire-9 (PHQ-9)²⁴ before treatment, PHQ-9 after the final ECT session, and the McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD)²⁵ during the patient's first hospital stay.

A total of 229 patients received ECT in the study time frame. Ninety-two patients were excluded because of the lack of recorded PHQ-9 scores (n=65), lack of recorded MSI-BPD scores before treatment (n=26), and rescindment of research consent (n=1). As a result, the final study population consisted of 137 patients whose PHQ-9 and MSI-BPD scores were recorded immediately before ECT treatment and whose PHQ-9 score was recorded on the final day of ECT administration. Of these patients, 29 had an MSI-BPD score of 7 or greater, which functioned as a sensitive and specific marker of a BPD diagnosis.²⁵ The other 108 patients were established as the control population without a diagnosis of BPD according to the MSI-BPD guidelines (Table 1).

Statistical Analysis

We collected supplementary data such as ECT lead placement, age at ECT, number of ECT treatments administered, and PHQ-9 scores at 1 month after the final ECT session. The differences between the mean PHQ-9 scores before and after ECT treatment were calculated and compared between patients by using JMP Pro Version 13.0 statistical software (SAS Institute Inc).²⁶ Multiple *t* tests were used to compare the change in PHQ-9 scores between

patients with and without BPD. Linear regression was also calculated to predict changes in the PHQ-9 scores based on the MSI-BPD scores, which was reported on a continuous scale (range, 0–10).

In cases where a patient received more than 1 series of ECT, only the earliest series with complete study data was considered. In this study, $P < .05$ was considered statistically significant.

Results

The PHQ-9 scores improved from admission (mean [SD], 20.40 [4.48]; severe depression) to completion of ECT (7.21 [6.36]; mild depression), thereby reflecting a marked improvement in the symptoms of depression (mean [SD] difference, 13.19 [6.90]; $P < .0001$) in the patient sample (Table 2).

Patients with an MSI-BPD score of 7 or greater ($n=29$) had significantly higher PHQ-9 scores on admission (mean [SD], 22.31 [3.91]) than patients with an MSI-BPD score less than 7 ($n=108$; mean [SD], 19.89 [4.50]; $P=.006$). After ECT treatment, the PHQ-9 scores obtained from the patients with an MSI-BPD score of 7 or greater (mean [SD], 7.93 [6.58]) did not differ from those of the patients with an MSI-BPD score less than 7 (mean [SD], 7.01 [6.31]; $P=.51$). A total of 49 patients in the Mood Disorders Unit simultaneously screened positive for BPD and had MDD, but 14 of these patients (mean [SD] PHQ-9 on admission, 22.06 [3.75]; $P=.79$) were not referred for ECT treatment despite similar illness severity as the 35 patients treated with ECT (mean [SD] PHQ-9 on admission, 23.17 [4.32]).

No significant difference in the mean change in PHQ-9 scores recorded before and after ECT treatment was noted between the patients with an MSI-BPD score of 7 or greater (mean, 14.38) and patients with an MSI-BPD score of 7 or less (mean, 12.87; $P=.85$). A nonsignificant regression equation was calculated ($F[1,135]=1.328$; $P=.25$) with an R^2 value of 0.010, thereby indicating the lack of a correlation between change in PHQ-9 score and MSI-BPD score (Figure).

Other factors such as lead placement, sex, race, and marital status did not have a significant role in the effectiveness of ECT treatment. The linear regression calculation that predicted the change in the PHQ-9 score based on the number of ECT treatments received was significant ($F[1,135]=0.500$; $P=.004$) with an R^2 value of 0.058. Another linear regression calculation used to predict changes in the PHQ-9 score based on age at ECT treatment was significant ($F[1,135]=-0.130$, $P<.01$) with an R^2 value of 0.049. However, the low R^2 values indicated that the correlations between these items were poor.

Some patients ($n=61$) continued follow-up care with Mayo Clinic providers after their ECT treatment (within 1 month of their original hospitalization). Patients in this group were discharged with a mean (SD) PHQ-9 score of 8.03 (6.58), which is consistent with mild depression. By the 1-month follow-up, the mean (SD) PHQ-9 score had increased to 12.08 (7.24), which is consistent with moderate depression. In this group, no significant difference in the mean PHQ-9 scores was noted between the patients with BPD (mean, 15.33) and the patients without BPD (mean, 11.29) at the 1-month follow-up ($P=.19$).

Discussion

This study showed an improvement in depression, as measured using the PHQ-9, in patients with and without BPD who received ECT. No significant differences in treatment response in the acute hospital setting or increases in the PHQ-9 at the 1-month follow-up were noted among the BPD and non-BPD cohorts. In contrast to previous research,²¹ these data showed that both patients with and without BPD can respond equally well to ECT in both the short and medium term.

However, these data do not necessarily indicate that ECT should be readily used for patients with MDD and BPD. The most important limitation of this study was the use of MSI-BPD to establish the presence of BPD because the results of a screening instrument are not equivalent to a diagnosis. In the inpatient ECT setting, a screening instrument could be an affordable and timely way to obtain a diagnostic foundation for a patient. However, the MSI-BPD instrument has only moderate validity when compared with diagnostic interviews, with a range of sensitivity ($.68 < Sn < 0.81$) and specificity ($.75 < Sp < .85$) depending on the study.^{25,27} A distinct possibility is that previous literature indicating that BPD reduces the efficacy of ECT²¹ is accurate, and the MSI-BPD is an unhelpful diagnostic instrument that should not be a factor used in the prescription of ECT.

Even if the MSI-BPD was an accurate surrogate for a diagnostic interview, our findings merit further context. Among the patients who screened positively for BPD, no significant difference in PHQ-9 scores was noted between those patients referred for ECT and those patients who were not referred, thereby suggesting that clinical decisions (and patient preference) had a role in determining which patients received ECT. This may suggest that the clinicians at our institution were cognizant of prior literature²¹ that suggested poor response to ECT for patients with BPD and reserved ECT treatment for patients with specific neurovegetative symptoms rather than chronic misery.

There are many valid reasons to limit ECT in the treatment of BPD. Reliance on somatic interventions can unwittingly undermine the key psychotherapeutic goals of making sense of one's inner experiences and describing the interpersonal context for symptom worsening. Somatic interventions can powerfully reinforce the conceptualization that "my medications aren't working" and interfere with skill development. Moreover, depression in patients with BPD tends to respond more robustly to hospitalization than depression in patients without BPD,²⁸ thereby suggesting that a move toward ECT may sometimes be unnecessary for patients who are most likely to benefit from the nonspecific holding environment of the hospital.

Another noteworthy limitation is the use of the PHQ-9. The PHQ-9 is a relatively simple assessment for depressive symptoms compared with the more comprehensive Hamilton Depression Rating Scale, which has been used by others to explore the interplay between BPD and depression.²¹

Despite these concerns, this study suggests that, at least for some patients, ECT may be a very effective therapeutic intervention; patients with BPD should not be denied consideration of this treatment. Indeed, even in older studies that showed an overall limited

response to ECT in patients with BPD, some patients clearly did respond well. Carefully selecting these patients may help ensure equally positive outcomes for patients with or without BPD, and future research could help clarify which patients with BPD—and which symptoms of depression—are most likely to benefit from ECT.

In summary, the findings of this study suggest that some patients with BPD and depression may benefit from ECT. The findings failed to confirm prior studies that showed a poorer treatment response and higher relapse rate when depression in BPD was treated with ECT. The findings should be interpreted cautiously, given the use of the MSI-BPD as a screening instrument and the role of clinicians in choosing which patients to recommend for ECT.

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Abbreviations

BPD	borderline personality disorder
ECT	electroconvulsive therapy
MDD	major depressive disorder
MSI-BPD	McLean Screening Instrument for Borderline Personality Disorder
PHQ-9	Patient Health Questionnaire-9

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Figure.

Linear Regression of the Changes in the PHQ-9 Scores After Electroconvulsive Therapy in Relation to the MSI-BPD Scores. MSI-BPD indicates McLean Screening Instrument for Borderline Personality Disorder; PHQ-9, Patient Health Questionnaire-9.

Table 1.

Baseline Demographic and Clinical Characteristics of Patients With Depression Who Received Electroconvulsive Therapy^a

Characteristic	Patients With BPD (n=29)	No.	Patients Without BPD (n=108)	Analysis	
				χ^2	PValue
Women	19 (65.5)	83	64 (59.3)	0.38	.54
White	27 (93.1)	129	102 (94.4)	0.08	.79
Never married	10 (34.5)	33	23 (21.2)	2.17	.14
				<i>t</i>	PValue
Age at ECT, mean (SD), y	46.1 (10.6)	137	48.4 (11.9)	0.97	.34

Abbreviations: BPD, borderline personality disorder; ECT, electroconvulsive therapy.

^aValues are No. (%) unless otherwise indicated.

Table 2.

Treatment Information and Response to ECT for Patients With and Without BPD

Characteristic	Patients With BPD (n=29)	Patients Without BPD (n=108)	Analysis	
			χ^2	P Value
BT lead placement, No. (%)	14 (48.3)	40 (37.0)	1.21	.55
RULUB lead placement, No. (%)	13 (44.8)	59 (54.6)		
Multiple lead placements, No. (%)	2 (6.9)	9 (8.3)		
			<i>t</i>	P Value
No. of ECT treatments, mean (SD)	8.93 (4.46)	8.70 (3.04)	0.26	.79
Pre-ECT PHQ-9 score, mean (SD)	22.31 (3.91)	19.89 (4.50)	2.86	.006
Post-ECT PHQ-9 score, mean (SD)	7.93 (6.58)	7.01 (6.30)	0.66	.51
PHQ-9 difference, mean (SD) ^a	14.38 (7.00)	12.87 (6.87)	1.04	.31

Abbreviations: BPD, borderline personality disorder; BT, bitemporal; ECT, electroconvulsive therapy; PHQ-9, Patient Health Questionnaire-9; RULUB, right unilateral electrode placement.

^aChange in the PHQ-9 scores between before and after ECT treatment.