Clinical Effectiveness of Electroconvulsive Therapy for Psychotic vs Nonpsychotic Depression:

A Cohort Study

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Abstract

Background: Individuals experiencing major depression with psychotic features (MD-P) may respond better and have fewer cognitive effects with electroconvulsive therapy (ECT) than those without psychotic features (MD-NP). However, this may be due to differences in patient characteristics aside from psychotic symptoms. The objectives of this study were to (1a) compare ECT treatment response and (1b) adverse cognitive effects between patients with MD-P and MD-NP and (2a) explore factors associated with treatment response or (2b) adverse cognitive effects.

Methods: This was a retrospective cohort study of adult inpatients with MD-P or MD-NP treated with an acute course of ECT at an academic psychiatric hospital June 2010–September 2021 in Toronto, Canada. Logistic regression was used to account for differences in patient characteristics between groups. Outcomes were identified using the clinical global impression improvement and cognitive function scales.

Results: 542 patients were included, 115 (21%) with MD-P and 427 (79%) with MD-NP. MD-P patients were more likely to be rated "very much improved" with ECT (41% vs 27%, $P = .003$) while adverse cognitive effects were similar (21% MD-NP vs 24% MD-P; $P > .05$). However, after accounting for confounders, psychotic symptoms were not associated with response (adjusted odds ratio [AOR]: 1.04; 95% confidence interval [CI], 0.95–1.14) or adverse cognitive effects (AOR: 1.30; 95% CI, 0.78–2.18).

Conclusions: Individuals with MD-P had a higher rate of response and similar rates of adverse cognitive effects compared to patients with MD-NP with ECT treatment. However, after accounting for differences in patient characteristics, we no longer identified an association between psychotic symptoms and treatment response.

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Major depressive disorder (MDD) is a common disabling mental health illness associated with increased morbidity and mortality and decreased quality of life.[1,2] Psychotic depression is a more severe form of MDD where there is a combination of both depressed mood and psychotic symptoms. The estimated prevalence of psychotic depression is 4 per 1,000 people in the general population, increasing to 14–30 per 1,000 people over the age of 60.[3–5] Of those with depression, 15% to 19% of patients also develop psychotic features.[5,6]

Major depression with psychosis (MD-P) is often under-recognized and inadequately treated.[7,8] Without treatment, MD-P has a low rate of spontaneous recovery and high risk of suicide, with a 69% relative risk of increase in suicidal death compared to major depression nonpsychotic (MD-NP) patients.[9] The results of pharmacologic trials suggest that the combination of an antidepressant with an antipsychotic is more effective than monotherapy with either one of them if the duration of treatment is adequate, achieving up to 77% response rate.[10–13] Individuals with psychotic depression are often severely ill, and pharmacotherapy can take weeks before showing improvement.[14] As a result, electroconvulsive therapy (ECT) is often recommended by guidelines as a first-line treatment for psychotic depression.[15,16]

ECT has been shown to have an overall response rate of 82%–90% for treating psychotic depression, which is

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Clinical Points

- Individuals experiencing major depression with psychotic features (MD-P) had higher response rates to electroconvulsive therapy (ECT) than those without psychotic features (MD-NP) and similar rates of adverse cognitive effects.

- After adjustment for confounders, the presence of psychotic symptoms no longer predicted ECT treatment response, but rather was predicted by age and antidepressant treatment.

- ECT is effective for multiple forms of depression (MD-P and MD-NP), but the dramatic responses observed in MD-P may be at least partly related to confounders.

superior to combination pharmacologic therapy.[15,17] Some clinical trials and retrospective cohort studies also showed a better outcome for psychotic depression than nonpsychotic depression with ECT treatment.[18,19] However, these studies had various limitations including small sample sizes,[18] no use of right-unilateral (RUL) electrode placement,[19] and often were conducted several decades ago using old ECT technologies such as sinusoidal pulse waves.[20] Similarly, baseline differences in the characteristics of patients with and without psychotic depression were not accounted for in analyses of treatment outcomes in MD-P with ECT—such as older age and greater baseline severity among those with MD-P.[19] Therefore, the commonly held view that ECT is more effective for MD-P compared to MD-NP may be related to these confounding factors, which is reflected in conflicting results from meta-analyses regarding presence of psychosis as a predictor of outcome.[21,22] In addition to uncertainty about efficacy, differences in tolerability between MD-P and MD-NP have not been examined in the literature for those treated with ECT. Given the importance of these side effects in the informed consent decision-making process, this is an important knowledge gap to address.[23]

As such, we hypothesized that patients with MD-P would respond better to ECT treatment compared to patients with MD-NP, while there would be no difference in adverse cognitive effects between the two groups. To address existing knowledge gaps and test our hypothesis, our study compared (1a) ECT treatment response and (1b) adverse cognitive effects between patients with MD-P and MD-NP while also accounting for differences in patient characteristics. We also aimed to explore potential factors associated with (2a) treatment response or (2b) adverse cognitive effect in these groups of patients following ECT.

METHODS

Study Design and Subjects

This study was conducted at the Centre for Addiction and Mental Health (CAMH), a tertiary psychiatric specialty hospital with approximately 550 inpatient beds, in Toronto, Canada. A chart review of all referrals to the CAMH ECT program from June 2010 to September 2021 was conducted. From the ECT referral forms completed by the referring psychiatrist, we obtained the following data: psychiatric diagnosis, psychotropic medications at time of referral, baseline clinical global impression of illness severity, admission status (voluntary vs involuntary), capacity, and ECT indication. This information was verified by a review of the patient's medical record. The study was approved by the CAMH research ethics board.

Patients were included if they met the following criteria: (1) a diagnosis of MDD with or without the presence of psychotic symptoms and (2) they received at least 1 ECT treatment on the inpatient unit as part of an acute treatment course. Patients were excluded if they were diagnosed with bipolar disorder or any primary psychotic disorder (eg, schizophrenia).

ECT Technique

Electrode placement was determined by the ECT psychiatrist based on variables such as risk of adverse cognitive effects, need for rapid response, and previous treatment protocols. The majority of patients received general anesthesia with methohexital 0.5–1.0 mg/kg IV and succinylcholine 0.25–0.75 mg/kg IV as the paralytic agent. Occasionally, propofol or etomidate were used as anesthetic agents, though this occurred in <1% of procedures. Rescue medications were used as needed for hypertension, nausea, and agitation. The ECT machine used was a MECTA spectrum 5000Q. All protocols employed a fixed 800 milliamps parameter setting. For all bitemporal (BL) treatment sessions, a 1.0 millisecond (ms) pulse width was used. The majority of RUL treatment sessions used an ultrabrief pulse with of 0.3–0.37 ms, though a small number of treatment courses used a standard pulse width of 1.0 ms. The stimulus dose titration method was used to determine seizure threshold in all patients. For determination of threshold, an adequate seizure was defined as a seizure lasting at least 15 seconds based on motor manifestation to ensure the seizure had generalized. After the threshold was determined, stimulus intensity was set at 1.5 times the seizure threshold for BL and 6 times the seizure threshold for RUL treatments. Patients receiving treatment with lithium or anticonvulsant medications were advised to taper these prior to treatment, with the exception of patients with a seizure disorder for whom anticonvulsant medications were indicated.

Assessment of Treatment Response

All patients who received at least 1 ECT treatment were eligible for assessment of treatment response. ECT response was determined based on referring

Table 1.

CGI Improvement Scale and CGI Cognitive Function Scale

Scale	Description
CGI improvement	
1—Very much improved	Patient chart documented dramatic benefit from ECT treatment. Examples: rapid discharge after treatment, reduction in need for medications, clear and complete resolution of target symptoms, and documentation such as "dramatic response" or "greatly improved."
2—Much improved	Patient chart documented benefit from ECT treatment. Examples: improvement justifying referral for maintenance ECT, substantial reduction in severity of target symptoms, and documentation such as "responded well" or "good response."
3—Minimally improved	Patient chart documented some benefit from ECT treatment. Examples: slight or moderate reduction in severity of target symptoms and documentation such as "improved somewhat" or "partial response."
4—No improvement or worse	Patient chart documented minimal to no benefit from ECT treatment. Examples: treatment stopped after 1–2 sessions due to side effects and documentation such as "no symptoms changes" or "no improvement noted."
CGI cognitive function	
1—None apparent	No cognitive effects were present.
2—Some impairment	Cognitive effects were present but no functional impairment.
3—Impaired with interference in function	Cognitive effects were present with resulting functional impairment.
4—Severe impairment	Indicated cognitive effects were present such that they outweighed the therapeutic benefit.

Abbreviations: CGI = Clinical Global Impression, ECT = electroconvulsive therapy.

clinician assessment of the Clinical Global Impression Improvement scale (CGI-I). Where this was not available, it was estimated using methods from previous work.[24,25] Prior work assessing the reliability of between clinician and chart review CGI-I has demonstrated good agreement.[24,25] Details regarding the CGI-I chart review methodology are available in Table 1.

Assessment of Adverse Cognitive Effects

Adverse cognitive effects were rated on a similar 4-point CGI scale of severity by referring physicians (Table 1). Where required, chart reviews for assessment of treatment cognitive effects were completed by the 2 primary authors (G.C.L. and R.S.K.).

Data Analysis

Descriptive analyses. We descriptively compared patient characteristics, clinical indications, admission status, patient capacity, ECT treatment characteristics, treatment response, and adverse cognitive effects in individuals with MD-P and MD-NP. We compared continuous data with a Student t test to compare means and categorical data with χ^2 analysis or Fisher exact test (in the case of small sample sizes). Descriptive analyses were conducted using only the first course of ECT in the observation period.

Multivariable analyses. To determine the association between psychotic symptoms and treatment outcome while accounting for baseline characteristics that may also impact treatment outcomes (ie, confounders), we used logistic regression models. For treatment response, we defined the outcome variable using the CGI-I. Response was defined as a CGI-I score of 1 and treatment nonresponse as CGI score of 2, 3, or 4. This threshold was selected as a CGI-I score of 1 corresponds to remission in depression,[26] which is the primary goal of depression treatment.[27] For adverse cognitive effects, the outcome variable was defined as the presence (cognitive CGI of 3 or 4) or absence (cognitive CGI of 1 or 2) of clinically significant adverse cognitive effects. The covariates for both models were the same in that they included all available baseline characteristics that could serve as potential confounders. This included age, sex, presence of psychotic symptoms (yes/no), voluntary vs involuntary status, capable vs incapable to consent to treatment, presence of catatonia, symptom severity, intermittent or regular benzodiazepine use, antipsychotic use (yes/no), antidepressant use (yes/no), and indication for ECT (suicidality, pharmacologic noncompliance, intolerance to medications, failure of pharmacologic treatment, history of prior response to ECT, and patient preference). All categorical covariates were assessed for sparse data, and where required combined into larger groups or, if not possible, then removed from the regression model. We included repeat courses of ECT for the same individual by using a generalized estimating equation (GEE) approach with an exchangeable correlation structure to account for the correlation among outcomes arising from within the same patient. We conducted a complete

Table 2.

Baseline Characteristics of Patients Receiving First Course of Electroconvulsive Therapy

Characteristic	Nonpsychotic depression (N = 427)[a]	Psychotic depression (N = 115)[a]	P value[b]
Demographic			
Age, y	48 (17)	54 (17)	<.001
Female	277 (65%)	75 (65%)	>.9
Clinical			
Starting electrode position			.017
BL	76 (18%)	32 (28%)	
RUL	351 (82%)	83 (72%)	
Admission status			<.001
Informal	3 (0.7%)	3 (2.6%)	
Involuntary	46 (11%)	44 (38%)	
Voluntary	378 (89%)	68 (59%)	
Capacity to consent to ECT			<.001
Capable	409 (96%)	79 (69%)	
Incapable	18 (4.2%)	36 (31%)	
Catatonic symptoms	4 (0.9%)	8 (7.0%)	<.001
Baseline CGI Severity			<.001
1	0 (0%)	0 (0%)	
2	0 (0%)	0 (0%)	
3	2 (0.5%)	0 (0%)	
4	56 (13%)	7 (6.1%)	
5	184 (43%)	36 (31%)	
6	178 (42%)	62 (54%)	
7	7 (1.6%)	10 (8.7%)	
Medications			
Antidepressant	282 (66%)	71 (62%)	.4
Antipsychotic	197 (46%)	69 (60%)	.008
Benzodiazepine use	113 (26%)	32 (28%)	.8
Anticonvulsant use	4 (0.9%)	0 (0%)	.6
ECT indications			
Failure of pharmacotherapy	344 (81%)	89 (77%)	.5
Suicidality	134 (31%)	37 (32%)	.9
Prior response to ECT	58 (14%)	20 (17%)	.3
Patient preference for ECT	68 (16%)	10 (8.7%)	.050
Noncompliance with pharmacotherapy	4 (0.9%)	8 (7.0%)	<.001
Intolerance of pharmacotherapy	26 (6.1%)	11 (9.6%)	.2
Violent behavior	3 (0.7%)	1 (0.9%)	>.9

[a]Mean (SD) or n (%).
[b]Welch 2-sample *t* test; Pearson χ^2 test; Fisher exact test.
Abbreviations: BL = bitemporal, CGI = Clinical Global Impression, ECT = electroconvulsive therapy, RUL = right unilateral.

case analysis given there was minimal missing data (<1%). We assessed for multicollinearity in our model to ensure variance inflation factor was <10 for all covariates included in the model. We also assessed model discrimination using the *c* statistic and model fit using the Hosmer-Lemeshow test. The regression model for this work was considered to be an explanatory, rather than predictive, model, and as such all covariates were included in the final model (ie, no variable selection procedures were performed) given their theoretical potential to confound the exposure (MD-P present or absent) and outcomes (treatment response or adverse cognitive effects).[28] The primary covariate of interest from

this model was the presence or absence of psychotic symptoms, which represents the effect of psychotic symptoms after accounting for all observed characteristics, though the effects of other covariates were reported as exploratory outcomes. As a sensitivity analysis, we also completed an analysis in which we adjusted for only 3 key confounders: age, sex, and hospitalization status.

All analyses were conducted using R (R Version 4.1.3 (2022-03-10)). Regression models were performed using the *geepack* package (Version 1.3.9).[29] Results were reported as odds ratios (ORs), and an α of 0.05 was used. This study was reported in agreement with the STROBE guidelines (available from corresponding author upon request).

RESULTS

Demographics and Treatment Characteristics

This study included 542 patients who received acute ECT as treatment for depression of which 115 (21%) had MD-P while 427 (79%) had MD-NP (Table 2). Individuals with MD-P compared to MD-NP were typically older (54 vs 48 years, respectively, $P < .001$), more likely catatonic (7.0% vs 0.9%, respectively, $P < .001$), involuntary (38% vs 11%, respectively, $P < .001$), more likely to be on antipsychotics (60% vs 46%, respectively, $P = .008$), and incapable to consent to ECT (31% vs 4%, respectively, $P < .001$). Individuals with MD-P also had higher baseline symptom severity as measured by the baseline CGI severity score. There was no statistically significant difference in terms of sex, antidepressant treatment, benzodiazepine use, or anticonvulsant use.

The primary reason for referral to ECT for both groups was failure of pharmacotherapy (77% MD-P and 81% MD-NP; $P = .5$). Individuals with MD-P were more likely to be referred due to medication noncompliance (7% vs 0.9%, respectively, $P < .001$) and receive bilateral electrode placement (28% vs 18%, respectively, $P = .017$). In contrast, individuals with MD-P were *less likely* to be referred due to patient preference (8.7% vs 16%, $P = .05$). There was no statistically significant difference between groups for other referral indications.

Descriptive Outcomes

Table 3 displays the treatment and cognitive outcomes for individuals with and without psychotic depression receiving ECT. Individuals with MD-P were significantly more likely to achieve a CGI-I score of 1 ("very much improved") (27% MD-NP vs 41% MD-P; $P = .003$), while individuals with MD-NP were significantly more likely to achieve a CGI-I score of 2 ("much improved") (49% MD-NP vs 38% MD-P; $P = .046$). In contrast, adverse cognitive effects associated with ECT were similar in both groups, with clinically significant adverse cognitive effects (cognitive CGI of 3 or 4) being nearly identical in both groups (21% MD-NP vs 24% MD-P; $P > .05$). Refer to Figure 1 for a graphical depiction of the CGI improvement and cognitive scores among patients with psychotic vs nonpsychotic depression.

Multivariable Models

Treatment response. Table 4 presents the results from the multivariable regression model for treatment response. Presence of psychotic symptoms did not have a statistically significant impact on treatment response with ECT (adjusted OR [AOR]: 1.04; 95% CI, 0.95–1.14). In our sensitivity analysis using a model with only age, sex, and hospitalization status as confounders, we found a similar effect size estimate regarding the effect size of psychotic symptoms (AOR: 1.04; 95% CI, 0.96–1.14). In the complete model, age had a statistically significant, albeit minimal, impact on treatment response (AOR: 1.003; 95% CI, 1.00–1.005). The presence of antidepressant treatment was associated with increased odds of treatment response (AOR: 1.10; 95% CI, 1.01–1.20). The presence of catatonic symptoms was associated with increased odds of treatment response, though it was not statistically significant (AOR: 1.30; 95% CI, 0.99–1.71).

Adverse cognitive effects. Table 4 presents the results from the multivariable regression model for adverse cognitive effects from ECT. Presence of psychotic symptoms did not have a statistically significant impact on the adverse cognitive effects after ECT (AOR: 1.30; 95% CI, 0.78–2.18). In our sensitivity analysis using a model with only age, sex, and hospitalization status as confounders, we found a similar effect size estimate regarding the effect size of psychotic symptoms (AOR: 1.29; 95% CI, 0.80–2.09). In the complete model, there was an increased odds of adverse cognitive effects associated with the presence of suicidality (AOR: 1.61; 95% CI, 1.02–2.55) and failed pharmacotherapy (AOR: 1.74; 95% CI, 1.05–2.89).

DISCUSSION

In the largest cohort study to date comparing treatment outcomes between individuals with MD-P and MD-NP receiving ECT, our work identified several clinically important outcomes. We found that among those with MD-P compared to MD-NP, ECT is associated with higher rates of dramatic treatment responses with similar rates of adverse cognitive effects. However, once baseline group differences are accounted for, the presence of psychotic symptoms is no longer predictive of treatment response, and, instead, characteristics like age, antidepressant treatment, and potentially catatonic symptoms are more strongly associated with treatment response. Similarly, analyses accounting for group differences failed to find an association of psychotic symptoms with adverse cognitive effects.

The current work is consistent with the seminal study conducted by the CORE Group comparing MD-P and MD-NP, which, in unadjusted analyses, found a significantly greater remission rate among those with MD-P compared to MD-NP (95% vs 83%, respectively).[19] However, our study differed in that only 41% of those with MD-P and 27% of those with MD-NP achieved a CGI-I score corresponding to remission.[26] This substantially lower remission rate may be a temporal effect, similar to what has been seen in studies examining pharmacotherapy clinical trials over time.[30] Moreover, two recent high-profile trials using ECT have not been able to replicate the dramatic remission rates of older studies. The ELEKT-D study comparing ECT with
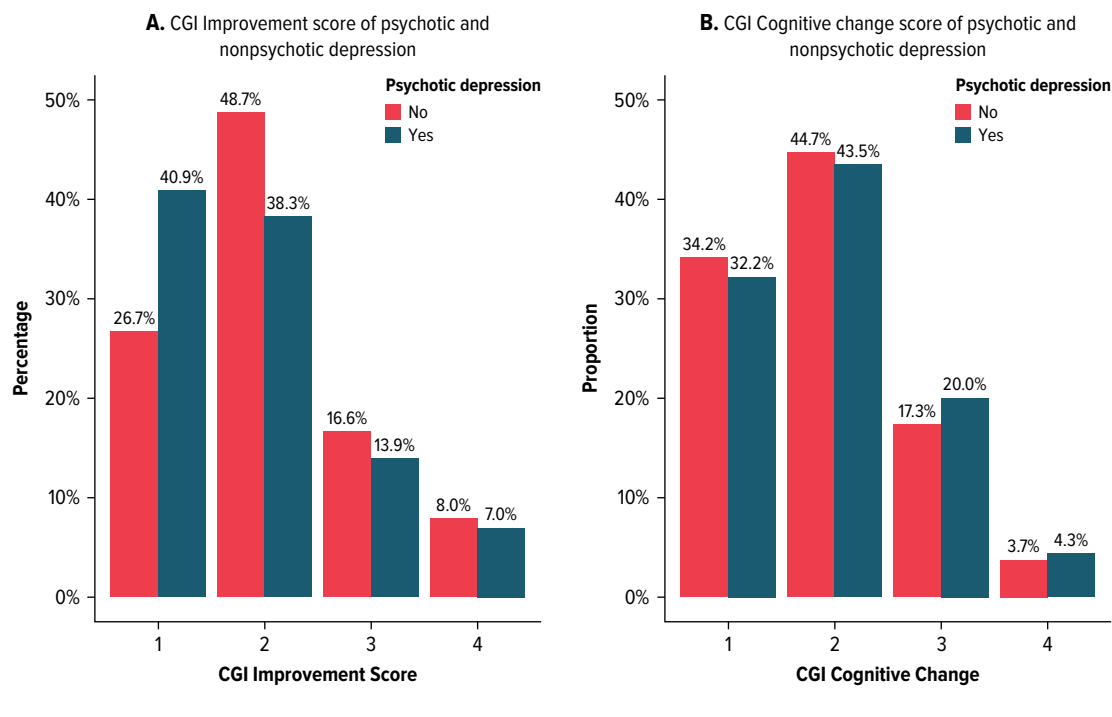
Table 3.

Treatment Outcome of First ECT Course

Characteristic	Nonpsychotic depression (N = 427)[a]	Psychotic depression (N = 115)[a]	P value[b]
CGI improvement from baseline			
1—Very much improved	114 (27%)	47 (41%)	.003
2—Much improved	208 (49%)	44 (38%)	.046
3—Minimally Improved	71 (17%)	16 (14%)	.5
4—No improvement or worse	34 (8.0%)	8 (7.0%)	.7
CGI cognitive impairment rating			
1—No impairment present	146 (34%)	37 (32%)	.7
2—Impairment present but not functionally impairing	191 (45%)	50 (43%)	.8
3—Impairment present and functionally impairing	74 (17%)	23 (20%)	.5
4—Impairment present and outweighs therapeutic benefit	16 (3.7%)	5 (4.3%)	.8

[a]n (%).
[b]Pearson χ^2 test, Fisher exact test.
Abbreviations: CGI = Clinical Global Impression, ECT = electroconvulsive therapy.

Figure 1.

Clinical Global Impression (CGI) Scores Among Patients With Psychotic vs Nonpsychotic Depression

A. CGI Improvement score of psychotic and nonpsychotic depression

B. CGI Cognitive change score of psychotic and nonpsychotic depression

ketamine found a 21.8% remission rate in ECT measured using the Montgomery-Asberg Depression Rating Scale (MADRS), and a study comparing ECT with magnetic seizure therapy found a 26% remission rate.[31,32]

Regarding the presence of psychotic symptoms, the prior study by Petrides et al,[19] after adjusting for confounders, found that psychotic symptoms were significantly associated with remission status (AOR: 1.22, $P < .001$). This is distinct from the current study, which failed to find an effect of psychotic symptoms on clinical outcomes. This may be related to the limitations of the regression model used in prior work, which only accounted for age, baseline symptom severity, age at first onset of illness, and number of prior episodes.[19] Moreover,

Table 4.

Results of Logistic Regression Models for Treatment Response and Adverse Cognitive Effects With ECT

Variable name	Treatment response adjusted odds ratio (95% CI)[a,b]	Adverse cognitive effects adjusted odds ratio (95% CI)[a,c]
Presence of psychotic depression	1.04 (0.95–1.15)	1.30 (0.78–2.18)
Age (y)	**1.00 (1.00–1.01)**	1.00 (0.98–1.01)
Female sex	1.02 (0.95–1.10)	0.83 (0.54–1.26)
Voluntary	0.92 (0.82–1.03)	1.53 (0.81–2.90)
Incapable to consent	1.00 (0.84–1.18)	0.88 (0.37–2.07)
Catatonia	1.30 (0.99–1.71)	0.92 (0.18–4.88)
Less severe baseline symptoms (CGI-S of 3 or 4)[d]	0.93 (0.84–1.04)	1.28 (0.66–2.48)
More severe baseline symptoms (CGI-S of 6 or 7)[d]	1.05 (0.96–1.13)	1.32 (0.84–2.10)
Antidepressants	**1.10 (1.01–1.20)**	0.63 (0.40–1.00)
Antipsychotics	1.03 (0.95–1.11)	1.07 (0.69–1.66)
Benzodiazepines	0.95 (0.88–1.04)	1.03 (0.64–1.65)
Suicidality	1.01 (0.93–1.10)	**1.61 (1.02–2.55)**
Failed pharmacotherapy	0.94 (0.86–1.03)	**1.74 (1.05–2.89)**
Prior response to ECT	1.08 (0.98–1.18)	0.93 (0.55–1.56)
Patient preference	0.92 (0.85–1.01)	0.99 (0.58–1.69)
Noncompliance to medications	0.86 (0.69–1.06)	0.59 (0.12–2.91)
Intolerance to medications	0.98 (0.85–1.13)	1.20 (0.53–2.74)
RUL starting electrode position[e]	1.01 (0.92–1.11)	0.93 (0.58–1.49)

[a]Statistically significant results are bolded.
[b]Model fit was adequate (Hosmer-Lemeshow test $P > .05$), and c statistic was 0.67.
[c]Model fit was adequate (Hosmer-Lemeshow test $P > .05$), and c statistic was 0.62.
[d]Reference group is CGI-S of 5.
[e]Reference group is bitemporal electrode position.
Abbreviations: CGI-S = Clinical Global Impression Severity, ECT = electroconvulsive therapy, RUL = right unilateral.

a recently published study compared remission rates after ECT in MD-P and MD-NP in late life depression and found greater remission rates in MD-P (68.9 vs 51%). This study also found that presence of psychotic symptoms was significantly associated with remission after controlling for a limited number of confounders (ie, age, sex, and severity of baseline symptoms).[23]

In contrast, our work suggests that when a broader range of confounders are accounted for, psychotic symptoms alone no longer drive the association with treatment response to ECT. Similar to our findings, a study done in a geriatric population also found greater age, but presence of psychotic symptoms was not related to favorable ECT outcomes even after controlling for putative confounders.[33] Consistent with prior work examining ECT responses and adverse cognitive effects, we also found that antidepressant treatment was positively associated with treatment response, which has been reported in other studies.[34] Similarly, though not statistically significant likely due to a small sample size (N = 12), there were increased odds of treatment response when catatonic symptoms were present, which is consistent with prior work.[35–37] Future work should examine the role of catatonia in response rates to ECT as it is one of the most common indications for ECT.[37]

It is important to note that despite utilizing a large clinically representative cohort, our study has several limitations. The retrospective design precludes causal interpretation between the variables and highlights the need for well-conducted prospective studies. Similarly, the inability to blind outcome assessment may introduce bias into the assessments. Another source of potential bias is unmeasured confounding (ie, variables not available in our dataset) that could have an important influence on our results such as the degree of treatment resistance. The outcome assessments used in this study were also global measures (eg, Clinical Global Impression scales)[38] rather than other commonly used, clinician-rated, symptom-specific, depression scales including the Hamilton Depression Rating Scale or the MADRS. While this approach allows for use in routine clinical practice and facilitates large sample sizes, it does not allow for assessments of specific symptom domains such as affective symptoms or psychotic symptoms. Similarly, for measuring adverse cognitive effects, we relied on global subjective ratings reported by treating psychiatrists rather than validated, standardized assessment tools such as the ElectroConvulsive Therapy Cognitive Assessment tool.[39]

Clinical Implications

Our study provides clinically relevant evidence regarding the treatment of both MD-P and MD-NP.

Our findings suggest that individuals with MD-P are more likely to display a significant treatment response, but that this effect may not necessarily be due to psychotic symptoms and may be related to associated patient and treatment factors such as age, concomitant medication treatment, and presence of catatonic symptoms. Encouragingly however, our findings indicate that the cognitive profile of ECT in both MD-P and MD-NP is similar. Taken together, our work supports the important role of ECT in the treatment of both MD-P and MD-NP. Further research consisting of prospective clinical trials using validated scales of symptom severity and cognitive assessments is warranted to better understand the underlying differences between MD-P and MD-NP and to refine treatment strategies for these distinct clinical entities.

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