Treatment Capacity and Clinical Outcomes for Patients With Schizophrenia Who Were Treated With Electroconvulsive Therapy: A Retrospective Cohort Study

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Background: Patients with schizophrenia are often found incapable to consent to psychiatric treatment. We evaluated clinical outcomes for incapable and capable patients with schizophrenia treated with electroconvulsive therapy (ECT). **Methods:** We conducted a chart review of all inpatients treated with an acute course of ECT between 2010 and 2018 at the Centre for Addiction and Mental Health, Toronto, Canada. Short-term outcomes included treatment response and cognitive impairment. We assessed whether incapable patients regained the capacity to consent to treatment. Long-term outcomes included readmissions and subsequent courses of acute or maintenance ECT. **Results:** A total of 159 (67%) incapable and 79 (33%) capable patients were included. Patients experienced treatment response (incapable, $n = 108$, 67.9%; capable, $n = 52$, 65.8%; $P = .771$) and few experienced cognitive impairment (incapable, $n = 21$, 13.2%; capable, $n = 19$, 24.1%; $P = .043$). A minority of patients were treated with a subsequent course of acute ECT (incapable, $n = 46$, 28.9%; capable, $n = 16$, 20.3%; $P = .162$). Incapable patients were more likely to be treated with maintenance ECT for at least 6 months (incapable, $n = 46$, 28.9%; capable, $n = 13$, 16.5%; $P = .039$). Both groups had similar readmission rates (incapable, $n = 70$, 44.0%; capable, $n = 35$, 44.3%; $P = 1.000$). Eight (5.0%) incapable patients regained capacity and 7 consented to further treatment. **Conclusions:** Irrespective of treatment capacity, the majority of patients demonstrated clinical improvement. Incapable patients experienced less cognitive side effects when compared with capable patients, though they had fewer treatments overall. This study informs clinicians, patients, and substitute decision-makers

about the outcomes and challenges of ECT in patients with schizophrenia.

Key words: incapable/capable/psychiatric illness

Introduction

Schizophrenia is a heterogeneous disorder that affects approximately 1% of people worldwide.^{1,2} Across the globe, annual costs to society for schizophrenia vary between US \$94 million and US \$102 billion.³ Schizophrenia is one of the leading causes of disability.⁴ About 30% of patients have treatment-resistant schizophrenia (TRS), which is a persistence of symptoms despite being treated with 2 or more antipsychotic medications.⁵ Compared with people with other forms of severe mental illnesses, patients with TRS often have worse outcomes, social functioning, and cognitive symptoms.⁶⁻⁸ While clozapine is the preferred treatment for patients with TRS, only 40% experience a clinically meaningful response.⁹ Additionally, the lifelong need for monthly blood draws during clozapine treatment, due to the risk of agranulocytosis, can be an impediment to its use.¹⁰ Electroconvulsive therapy (ECT) is a clinically effective treatment option for patients with severe TRS.¹¹

Approximately, 1 million patients are treated with ECT annually.^{12,13} Patients with schizoaffective disorder, which resembles schizophrenia concurrent with a major mood episode (such as major depression or mania),¹⁴ are commonly treated with ECT.¹⁵ Despite negative media portrayals^{16,17} and associated stigma,¹⁸ ECT is safe and

effective.^{11,19–21} ECT in combination with clozapine can lead to a marked reduction of positive symptoms in 50% of patients with schizophrenia.²² ECT is particularly effective at targeting the positive symptoms of schizophrenia, including hallucinations and delusions.²³

Patients diagnosed with schizophrenia, however, may lack the capacity to consent to ECT. Definitions of treatment capacity are specific to a given jurisdiction, but generally, a person is considered capable, or has treatment capacity, if he/she understands the proposed treatment and appreciate the consequences of consenting to or refusing such treatment. Capacity can fluctuate,²⁴ and there is variability in decisional capacity between patients with schizophrenia.^{25,26} Furthermore, patients with schizophrenia often fare worse with respect to capacity for medical treatment when compared with patients with other forms of physical or mental illness.^{27,28}

Several studies have described the outcomes for patients with mental illness who were treated with ECT as incapable or involuntary patients.^{29–34} In Ontario, Canada, involuntary admission does not require a lack of capacity but patients lacking capacity are more likely to be admitted to hospital involuntarily.^{35–37} The usual criteria for involuntary admission include a diagnosis of a psychiatric illness and risk of harming herself/himself or others or a risk of serious physical impairment. Two studies suggested that there were no differences in clinical outcomes between consenting/voluntary and involuntary/non-consenting patients.^{30,31} In one study, incapable patients had longer hospital stays and illness recurrence.³² A case series³³ only described patients who were treated involuntarily. Most of the patients had treatment response, regained capacity, and agreed to further treatment. Half of the patients experienced transient side effects.³³ Similarly, in another study, most of the patients experienced a marked clinical response and regained the capacity to consent to psychiatric treatment.²⁹ In another observational study that compared patients who either lacked or had the capacity to consent to psychiatric treatment, objective psychiatric ratings of symptoms, mood, cognition, quality of life, and function improved similarly in both groups. There was a greater improvement in mood and function for the patients who lacked the capacity to consent to psychiatric treatment.³⁴ However, these studies were limited by their small sample sizes. Furthermore, the studies were not exclusive to patients with a diagnosis of schizophrenia or schizoaffective disorder.

Considering the limitations and paucity of previous studies examining outcomes for incapable patients with schizophrenia, we sought to compare clinical and cognitive outcomes for capable and incapable patients with schizophrenia and schizoaffective disorder who were treated with ECT. Additionally, we sought to determine whether capacity to consent to treatment was regained by incapable patients and whether these patients consented to additional treatment with ECT. Finally, we

sought to examine the long-term outcomes, including receipt of a subsequent acute course of ECT, maintenance course of ECT, and 6-month readmission rates. We hypothesized that both incapable and capable patients would experience similar treatment responses and cognitive impairment. We also hypothesized that capable patients would have better long-term outcomes than incapable patients.

Methods

Participants and Study Design

This study was completed at the Centre for Addiction and Mental Health (CAMH), a tertiary mental health hospital in Toronto, Canada. We completed a retrospective chart review of all inpatients with schizophrenia or schizoaffective disorder referred to the ECT service at CAMH who were treated with at least one acute course of ECT between January 13, 2010 and September 10, 2018. For patients who received more than one course of acute ECT, we examined data and outcomes related to their first treatment course. The diagnosis for each patient was based on a clinical impression using the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV and DSM-V criteria and review of the chart, by the attending psychiatrist. Formal diagnostic interviews were not conducted.

The assessment of capacity followed a standardized clinical approach: capacity was first assessed by the attending inpatient physician and at the time of consultation with the ECT service, a second capacity assessment was conducted by the consultant ECT psychiatrist. Any changes to a patient's capacity should be recorded in the patient's electronic medical records by the treating physician. There is no mandated frequency for formal reevaluation of treatment capacity during an admission. Treatment capacity is generally reevaluated by the treating physician at the time of discharge from hospital as this has implications for outpatient treatment. Ethics approval was received from the Research Ethics Board at CAMH (Protocol # 059/2016).

Capacity Procedures in Ontario, Canada

All patients are presumed capable to consent to treatment unless proven otherwise. A patient is considered capable to consent to treatment if he/she demonstrates the ability to understand the proposed treatment and the ability to appreciate the consequences of consenting to or refusing treatment.^{38,39} If the patient does not meet either one of the criteria, the patient is found incapable of consenting to treatment. A substitute decision-maker (SDM) is then appointed to make treatment decisions on the incapable person's behalf, considering the prior expressed wishes of the patient and their values, if known. The SDM is selected based on a legislated hierarchy.³⁸ All incapable

inpatients meet with a rights advisor and are informed of their rights through a legislative form. In the province of Ontario, patients may appeal their finding of incapacity to the Consent and Capacity Board (CCB).

ECT Technique

Patients were treated with the MECTA spectrum 5000Q ECT machine. Electrode placement and stimulus dosage were individually determined for each patient by the consultant ECT psychiatrist. This was completed by considering the risk of cognitive adverse events, need for rapid response, illness severity, past psychiatric history, and previous treatments. Seizure threshold was established for each patient using the stimulus dose titration method. Anesthesia generally consisted of intravenous methohexital (0.75–1.0 mg/kg) for sedation and intravenous succinylcholine (0.5–0.75 mg/kg) for muscle relaxation.

Short-Term Outcomes

The short-term outcomes that were assessed included treatment response and cognitive impairment. We also assessed whether incapable patients regained the capacity to consent to treatment and consented to further treatment with maintenance ECT. The latter 2 outcomes were assessed by the first author through a review of patient medical records.

Treatment Response. Using the methods described previously,^{40,41} treatment response following ECT was assessed by the second author through a review of patient medical records. Outcomes were evaluated using a variation of the Clinical Global Impression Improvement (CGI-I) scale.⁴² This is referred to as the clinical CGI-I (c-CGI-I). Treatment response following ECT using the c-CGI-I was rated as follows:

1. Excellent: The patient experienced a dramatic response. Examples include decreased need for pharmacotherapy, quick discharge following ECT, and complete resolution of target symptoms.
2. Good: The patient responded to treatment well. Examples include substantial decrease in the severity of target symptoms and improvements leading to referral for maintenance ECT.
3. Moderate: The patient experienced some benefit. An example includes partial decrease in the severity of target symptoms.
4. Poor: The patient experienced minimal to no benefit. An example includes stopping treatment after 1 to 2 sessions due to side effects.

For statistical analyses, a rating of “excellent” or “good” was categorized as treatment response. In contrast, a score of “moderate” or “poor” was categorized as no treatment response.

The attending psychiatrist was asked to complete the CGI-I after each course of ECT. However, these data were not available for all patients due to attending psychiatrist compliance ($n = 97$). In an effort to ensure outcomes for the entire sample and validate the CGI done by the attending psychiatrist, we used the c-CGI approach (a retrospective review of patient electronic medical records). The c-CGI-I score obtained by one of the authors was used as the measure of treatment response.

Cognitive Impairment. Cognitive impairment experienced following ECT was rated as “none,” “mild,” “moderate,” or “severe” by the treating clinician. Where values were missing, ratings were obtained by the second author through a review of patient medical records. Cognitive impairment was typically described as moderate or severe if the following details were associated with treatment:

1. Cognitive effects defined as “significant,” “major,” or “severe”
2. Cognitive effects led to significant distress for the patient
3. Cognitive effects led to early stoppage or modification of ECT treatment course
4. Cognitive effects associated with functional difficulties

For statistical analyses, a rating of “moderate” or “severe” was categorized as cognitive impairment. In contrast, a rating of “none” or “mild” was categorized as no cognitive impairment.

Long-Term Outcomes

The long-term outcomes were assessed following the patient’s discharge from hospital for their initial course of treatment with acute ECT. These outcomes include any readmissions or emergency department visits to our institution (within 6 months of discharge from hospital), any subsequent course of maintenance ECT (for at least 6 months, less than 6 months, or none), and any subsequent course of treatment with acute ECT. A course of maintenance ECT was defined as treatment that occurred at a minimum of 1-week intervals for more than 2 weeks after the acute ECT period (defined as treatment occurring at 2 or 3 times per week) ended. Tapering was allowed for a maximum of 2 weeks after the acute ECT treatment course.

Outcomes for Subgroups

We also describe 6-month readmission rates for patients treated with varying amounts of maintenance ECT following their initial acute course of ECT. Outcomes specific to patients with schizophrenia, schizoaffective disorder, patients with concurrent clozapine use, and patients with concurrent antipsychotic medication use,

excluding clozapine, are also described. These are in the [supplementary materials](#).

Statistical Analyses

Statistical analyses were completed using the software SPSS Statistics version 26 (IBM Corporation). All statistical tests were 2-tailed with a significance set to 0.05. Continuous variables were analyzed using Student's *t*-tests, and categorical values were analyzed using Fisher's exact test.

Results

Patient and Treatment Characteristics

A total of 159 (67%) incapable and 79 (33%) capable patients were included in this study. The mean duration of follow-up was 60.5 months (min. 6.9 months to max. 109.9 months). Incapable patients were significantly more likely to be diagnosed with schizophrenia, while capable patients were more likely to be diagnosed with schizoaffective disorder ($P = .001$). Capable patients had significantly more treatment sessions during their acute treatment course (incapable: $n = 9.5 \pm 5.1$; capable: $n = 13.3 \pm 6.0$; $P < .001$). There were differences in illness severity at baseline. Detailed patient and treatment characteristics can be found in [tables 1 and 2](#).

Capable patients were significantly more likely to have a voluntary admission status (incapable: $n = 44/159$, 27.7%; capable = 56/79, 70.9%; $P < .001$). Involuntary patients are detained in the hospital under the Mental Health Act in Ontario and cannot leave the hospital because they pose a risk to themselves or others. In contrast, voluntary patients may leave the hospital without restriction. Fourteen patients contested their finding of incapacity for ECT but still received treatment as the CCB upheld the finding of incapacity to consent (see [supplementary materials](#) for outcomes).

Short-Term Outcomes

Treatment Response. We did not find a significant difference between capable and incapable patients for treatment response ($P = .771$). Most incapable ($n = 108/159$, 67.9%) and capable ($n = 52/79$, 65.8%) patients experienced "excellent" or "good" treatment response based on the c-CGI-I.

Cognitive Impairment. There was a significant difference between capable and incapable patients for cognitive impairment ($P = .043$). A higher proportion of capable patients ($n = 19/79$, 24.1%) experienced cognitive impairment than incapable patients ($n = 21/159$, 13.2%). These cognitive impairments were considered "moderate" or "severe."

Capacity-Specific Outcomes. At the end of the acute course of treatment, 8/159 (5.0%) incapable patients

Table 1. Patient Characteristics

	Incapable (<i>n</i> = 159)	Capable (<i>n</i> = 79)	Fisher's Exact Test or Student's <i>t</i> -test (<i>P</i> -value)
Age, mean $\pm$ SD [min-max]	46 $\pm$ 15.6 [19–83]	43 $\pm$ 11.2 [22–65]	–1.872; (206), .063
Male gender, <i>n</i> (%)	93 (58.5)	51 (64.6)	.4
Voluntary, <i>n</i> (%)	44 (27.7)	56 (70.9)	<.001
Diagnosis, <i>n</i> (%)			
Schizophrenia	104 (65.4)	34 (43.0)	.001
Schizoaffective disorder	55 (34.6)	45 (57.0)	
CGI-S, <i>n</i> (%)			
Normal	0 (0)	0 (0)	1
Borderline ill	0 (0)	0 (0)	1
Mildly ill	0 (0)	1 (1.3)	.332
Moderately ill	0 (0)	5 (6.3)	.004
Markedly ill	64 (40.3)	40 (50.6)	.165
Severely ill	80 (50.3)	29 (36.7)	.054
Among the most severely ill	15 (9.4)	4 (5.1)	.314
Social assistance, <i>n</i> (%)	147 (92.5)	78 (98.7)	.066
Referral indication, <i>n</i> (%) ^a			
Suicidality	141 (88.7)	61 (77.2)	.033
Violent behavior	27 (17.0)	3 (3.8)	.003
Failed pharmacotherapy	117 (73.6)	65 (82.3)	.148
Intolerance of adequate pharmacotherapy	18 (11.3)	10 (12.7)	.832
Noncompliance with pharmacotherapy	24 (15.1)	5 (6.3)	.059
Previously failed continuation maintenance pharmacotherapy	21 (13.2)	9 (11.4)	.836
Prior good response to ECT	28 (17.6)	10 (12.7)	.355
Concurrent medication use, <i>n</i> (%)			
Any antipsychotic	157 (98.7)	77 (97.5)	.602
First-generation antipsychotic	66 (41.5)	18 (22.8)	.006
Second-generation antipsychotic	57 (35.8)	36 (45.6)	.16
Clozapine	86 (54.1)	36 (45.6)	.271
Antidepressant	31 (19.5)	37 (46.8)	<.001
Mood stabilizer	18 (11.3)	9 (11.4)	1
Antiepileptic	4 (2.5)	7 (8.9)	.045
Benzodiazepine (regular)	29 (18.2)	13 (16.5)	.857
Benzodiazepine (as needed)	37 (23.3)	23 (29.1)	.345

Note: CGI-S, Clinical Global Impression Severity; ECT, electroconvulsive therapy.

^aMultiple responses were allowed for referral indications.

regained capacity. At our institution, a new consent is required when patients go on to receive maintenance ECT. Of the patients who developed the capacity to consent to ECT at the end of the acute course, 7/8 (87.5%) chose to

Table 2. Treatment Characteristics

	Incapable (<i>n</i> = 159)	Capable (<i>n</i> = 79)	Fisher's Exact Test or Student's <i>t</i> -test (<i>P</i> -value)
Number of treatment sessions, mean $\pm$ SD [min-max]	9.5 $\pm$ 5.1 [1–38]	13.3 $\pm$ 6.0 [1–22]	–5.143; (180), <.001
Electrode placement, <i>n</i> (%)			
Bilateral	136 (85.5)	55 (69.6)	.005
Bilateral $\rightarrow$ right unilateral	2 (1.3)	0 (0)	1
Right unilateral	6 (3.8)	6 (7.6)	.225
Right unilateral $\rightarrow$ bilateral	15 (9.4)	18 (22.8)	.009
Pulse width (msec), <i>n</i> (%)			
0.3	11 (6.9)	16 (20.3)	.004
0.3 $\rightarrow$ 1	6 (3.8)	4 (5.1)	.734
1	142 (89.3)	59 (74.7)	.004
Pulse frequency (Hz), mean (SD)	58.39 (16.49)	54.32 (12.78)	–2.099; (195), .037
Pulse duration (s), mean (SD)	2.92 (1.63)	3.04 (1.64)	.517; (154), .606
Pulse charge (mC), mean $\pm$ SD [range]	247.86 $\pm$ 154.20 [57.6–576]	213.86 $\pm$ 141.44 [9.6–576.0]	–1.694; (168), .092

continue with maintenance ECT and gave informed consent. In total, 7/91 (7.7%) who were incapable at the start of acute ECT were capable to consent to a maintenance course of treatment. Furthermore, on review of charts, an additional 6/91 (6.6%) of these patients eventually became capable to consent after long-term treatment with maintenance ECT (>6 months of treatment).

Detailed characteristics of short-term treatment outcomes can be found in [table 3](#).

Long-Term Outcomes

For patients who were treated with maintenance ECT, the median number of treatment sessions was 14 (interquartile range 33, range 1–324). A minority of incapable (*n* = 46/159, 28.9%) and capable (*n* = 16/79, 20.3%) patients underwent a subsequent acute course of ECT (*P* = .162). Incapable patients (*n* = 46/159, 28.9%) were more likely than capable patients (*n* = 13/79, 16.5%) to be treated with maintenance ECT for at least 6 months (Fisher's, *P* = .039). A total of 45/159 (28.3%) incapable and 18/79 (22.8%) capable patients were treated with less than 6 months of maintenance ECT (*P* = .436). In contrast, 68/159 (42.8%) incapable and 48/79 (60.8%) capable patients did not receive any maintenance ECT (Fisher's *P* = .013). A similar proportion of incapable (*n* = 70/159, 44.0%) and capable patients (*n* = 35/79, 44.3%) were readmitted to CAMH within 6 months of discharge from

Table 3. Short- and Long-Term Outcomes for Incapable and Capable Patients Who Were Treated With Electroconvulsive Therapy

	Incapable (<i>n</i> = 159)	Capable (<i>n</i> = 79)	Fisher's Exact Test (<i>P</i> -value)
Regain capacity after acute course, <i>n</i> (%)	8 (5.0)	n/a	n/a
Receipt of maintenance ECT as capable patient, <i>n</i> (%)	7 (4.4)	n/a	n/a
Treatment response, <i>n</i> (%)	108 (67.9)	52 (65.8)	.771
Cognitive impairment, <i>n</i> (%)	21 (13.2)	19 (24.1)	.043
Readmission within 6 mo of discharge, <i>n</i> (%)	70 (44.0)	35 (44.3)	1
Treatment with subsequent course of acute ECT, <i>n</i> (%)	46 (28.9)	16 (20.3)	.162
Treatment with maintenance ECT for at least 6 mo, <i>n</i> (%)	46 (28.9)	13 (16.5)	.039
Treatment with maintenance ECT for less than 6 mo, <i>n</i> (%)	45 (28.3)	18 (22.8)	.436
No treatment with maintenance ECT, <i>n</i> (%)	68 (42.8)	48 (60.8)	.013

Note: ECT, electroconvulsive therapy.

hospital (*P* = 1.000). Additional details on long-term outcomes can be found in [table 3](#).

Outcomes for Subgroups

Outcomes for subgroups can be found in the [supplementary materials](#).

Discussion

To our knowledge, this is the largest study to compare outcomes between capable and incapable patients with schizophrenia and schizoaffective disorder treated with ECT. We report on a clinically representative group of patients and our results are likely generalizable to other clinical settings globally where ECT is used. Our results indicate that ECT is associated with a positive treatment response and a lesser degree of cognitive impairment in both patient populations. Given that incapable patients had less ECT treatment sessions during the acute course, yet equivalent symptom improvement and better cognitive outcomes, incapable patients may have a more robust response to treatment than capable patients. This may be related to higher symptom severity in domains that are responsive to ECT such as positive symptoms.

Ethical issues surrounding the use of ECT in patients with schizophrenia can be complex. The 4 *prima facie* principles in healthcare ethics are respect for autonomy,

beneficence, nonmaleficence, and justice.⁴³ Respecting patient autonomy often amounts to respecting a capable patient's wishes and preferences for treatment, and patients should be free to make decisions about treatment without coercive influences. Autonomy can be complicated among incapable patients and procedures were followed to protect the rights of individuals in our study. All incapable patients in our study had an SDM who provided written informed consent for treatment. Additionally, all incapable patients had the option of contesting their finding of incapacity to the CCB of Ontario. Additionally, most incapable patients (152/159, 95.6%) received Rights Advice. The remaining patients either did not meet the criteria for Rights Advice (ie, forensic patients with mandated treatment) or were long-standing patients, and the corresponding documentation could not be found in their electronic medical records but was documented elsewhere.

The principles of beneficence—the obligation to promote the patient's well-being—and nonmaleficence—the obligation to not cause harm—suggest that clinicians have an obligation to provide patients with treatments that maximize their clinical benefit-to-risk ratio. Our study and a recent systematic review⁴⁴ indicated that ECT is a clinically safe and effective procedure for patients with schizophrenia. While most of the patients in our study were markedly or severely ill at baseline, over 65% of patients experienced a clinically meaningful treatment response. For nonmaleficence, few incapable (21/159; 13.2%) and capable (19/79; 24.1%) patients experienced cognitive impairment noticeable to others. ECT is considered one of the safest procedures in medicine from a medical morbidity standpoint.^{45–47} Although we restricted our study to cognitive impairment, future studies may want to evaluate other medical adverse events associated with the treatment given the high comorbidity of cardiovascular disease in patients with schizophrenia. Multiple treatment options may be considered prior to pursuing ECT. However, most of the patients in our study were referred because of failed pharmacotherapy (including clozapine in approximately half the patients) or suicidality. ECT was likely prescribed because of its potentially higher clinical benefit to risk profile.

Justice relates to the element of fairness in treatment. ECT should be accessible to anyone who would benefit from it. While ECT access at our facility is open to all patients after psychiatric and medical suitability assessment, referral to the service is dependent on inpatient psychiatrists. Therefore, some patients who could benefit may not be referred due to physician preference, reflecting issues in equity of access to ECT. Unfortunately, we could not address the issue of justice and access to ECT in this study as it would encompass a detailed review of all patients admitted with schizophrenia.

We found that 8/159 (5.0%) patients regained capacity during this study. The methods used to assess whether patients regained capacity and consented to

further treatment with ECT were limited. There is often a lack of motivation by the attending psychiatrists to formally restore a patient's capacity during an admission; it may gradually reemerge and not be clearly documented. Further improvement in capacity may have gone undetected due to lack of reassessment and assent to treatment. Although 8/159 (5.0%) incapable patients regained capacity, this does not necessarily mean that the remaining patients did not regain capacity. In addition, the development of capacity may require much longer periods of symptom control.

Previous studies^{29,30,33,48} found that between 0%⁴⁸ and 88%³³ of incapable patients regained capacity while being treated with ECT. In our study, most patients in both groups experienced treatment response, with some cognitive impairments. These findings are consistent with a systematic review.⁴⁴ Furthermore, incapable patients were significantly less likely to experience cognitive side effects than capable patients. This may be explained by differences in illness severity at baseline and incapable patients receiving less ECT treatment sessions. It is also important to recognize that there were several differences at baseline between incapable and capable patients, and thus inferences about differences in outcomes should be made with caution. Furthermore, although patients experienced therapeutic benefit with few adverse events, pursuing ECT in this severely ill and incapable population warrants further investigation. Previous studies indicated that ECT can improve quality of life for patients who lack capacity,⁴⁸ and that most patients who lacked capacity were likely to be satisfied with ECT treatment.⁴⁹ Additional studies are warranted, including a comprehensive ethical analysis.

The effectiveness of ECT in the incapable patients was further supported by the long-term outcomes that we measured. Less than half of patients in either group received a subsequent course of acute ECT or experienced readmissions. This finding is consistent with another study that found no significant differences for 6-month readmission rates between voluntary and involuntary patients.³⁰ Another retrospective study found that about a third of psychiatric patients treated with ECT were readmitted within 6 months of treatment.⁵⁰

Our results indicated that incapable patients were significantly more likely to be treated with maintenance ECT than capable patients. Maintenance ECT is typically effective at preventing relapse in patients with schizophrenia.⁵¹ In the future, it may be beneficial to evaluate relapse rates at 1 year and later. In one study, the relapse-free rate at 1 year for patients with schizophrenia who were treated with acute ECT was 57.3%, and the median relapse-free period was 21.5 months, when excluding continuation or maintenance ECT.⁵²

A strength of our study is the evaluation of both short- and long-term outcomes. There are very few studies that reported on capacity in populations of

patients with schizophrenia referred for ECT. The high number of incapable patients is consistent with our previous report⁵³ in a smaller sample and is also consistent with a high degree of symptom severity in this population.

This study had several limitations. The retrospective design meant that we could formulate associations but could not establish causation. Patient groups differed on some baseline characteristics, such as medication use and treatment details, which may have affected the overall outcomes. In addition, the use of global measures of treatment response and cognitive impairments as opposed to more comprehensive rating instruments for these domains is also a limitation. Another potential weakness is the use of c-CGI-I to estimate CGI-I. However, the c-CGI-I allows for retrospective ratings based on clinical documentation in the medical record. It also allows for observations in a larger population. The c-CGI-I has been used in previous studies to characterize maintenance treatment outcomes in patients with schizophrenia treated with ECT.⁵³ A previous study by our research group⁴⁰ found that there is good agreement between the c-CGI-I and CGI-I. The CGI is a tool for routine use in a psychiatric inpatient setting. The CGI is sensitive to change, easy to administer, useful for different diagnoses, and reliable when used by trained clinicians.⁵⁴ When compared with other validated scales, such as the Brief Psychiatric Rating Scale and the Positive and Negative Symptom Scale, the CGI is effective at predicting remission in patients with schizophrenia.⁵⁵ The c-CGI-I and CGI have convergent validity as they measure the same construct. Another study limitation was the subjective methods used to assess cognitive impairment. Where ratings were missing, these were obtained through a review of patients' electronic medical records. As these ratings were subjective, there is a potential for bias toward a lack of cognitive impairments. As this was a retrospective review of patient medical charts, there is the potential for documentation bias. To minimize documentation bias, information in a database was verified through a review of patient medical records. There is the potential for missing data due to incomplete physician documentation.

Through this retrospective study, we described the clinical outcomes for capable and incapable patients with schizophrenia and schizoaffective disorder who were treated with ECT. ECT has demonstrated marked effectiveness with rapid symptom amelioration in patients with severe psychosis and catatonia.^{11,56,57} As such, ECT may be seen as a lifesaving intervention for some patients as the consequences of catatonia can include dehydration, deep vein thromboses, and potentially death related to pulmonary emboli.⁵⁸ Furthermore, for those patients with severe psychosis and aggression, not pursuing treatment with ECT risks repeated injectable antipsychotics and repeated seclusion room use.^{59,60} However, ECT

is different than other surgical or medical procedures used in patients who cannot consent treatment as it requires repeated administration and works over a period of weeks.

Our study demonstrated that ECT is a clinically effective and safe treatment for incapable and capable patients with schizophrenia and schizoaffective disorder. Although incapable patients were more likely to be treated with a subsequent course of maintenance ECT, a minority of both incapable and capable patients received a subsequent course of acute ECT or experienced readmissions within 6 months of discharge from hospital. Future studies may consider an epidemiological approach and propensity score matching using administrative health system data to evaluate the broader effects of ECT on health service utilization, as well as comparing outcomes in incapable and capable patients in other disorders. Particularly from the ethical perspective of justice, where everyone should be able to participate in research studies, prospective studies in this ill and incapable to consent population should be conducted. The benefits demonstrated in this study and the serious burden of illness in the most severely ill patients with psychosis warrant consideration of strategies on how to conduct prospective research in this population. Further investigations of the potential benefit of ECT for patients with schizophrenia regardless of treatment capacity are warranted.

Supplementary Material

Supplementary material is available at *Schizophrenia Bulletin*.

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