ECT Use in Adolescents at Mayo Clinic: A 20-Year Practice and Outcomes Review

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Abstract

Background: Electroconvulsive therapy (ECT) remains one of the most effective treatments for major depression in adults with acute response rates that are higher than most monotherapy pharmacotherapies. Current literature supports the use of ECT in children and adolescents with reports suggesting similar clinical outcomes as adults and are congruent with the Treatment Parameters for Adolescent ECT set forth by the American Academy of Child and Adolescent Psychiatry. However, due to a number of factors such as negative public image of ECT, fear of side effects of ECT, and most notably lack of controlled investigation, patients, families, and practitioners are hesitant to use ECT as a treatment option in the pediatric population despite its recognized efficacy.

Objectives: The objective of this project was to describe common practice approaches and post-treatment outcomes in a group of pediatric patients treated with ECT within the Mayo Clinic practice over the past 20 years. These data extend the research described in a previous Mayo Clinic adolescent cohort by Schneekloth and colleagues.

Methods: A retrospective analysis of the Mayo Clinic electronic medical record was performed using procedures within the IRB-approved protocol (07-00306) for all patients ages 18 and younger who had received ECT treatment at Mayo Clinic. Patients were identified using a traditional query of the medical record from 1993 through 2012 and an advanced electronic query using the Data Discovery and Query Builder (DDQB).

The DDQB is a tool that allows authorized research users to access clinical and administrative data stored in the Mayo Clinic Life Sciences System (MCLSS), a clinical database developed through a Mayo/IBM collaboration. Each patient’s medical chart was reviewed to verify ECT administration during their care at Mayo Clinic. All available treatment settings, side effects, medications and diagnoses were recorded. Where possible, pre-ECT and post-ECT clinical data were recorded.

Results: A total of 46 adolescents treated with ECT from 1993 to 2012 were identified (Table 1). 67% (n=31) of patients were treated bilaterally, while 84% (n=23) were treated with right unilateral, bitemporal or right unilateral, and bilateral modes, respectively. On average, patients received 14.3 ECT treatments per treatment series, and patients most often required only one series of treatment (74%, n=33), although some required two (22%, n=10) or even three series (2%, n=1, Table 1). EEG seizure duration tended to be prolonged as patients increased in age, although 32% (n=9) of induced seizures were prolonged by definition (longer than 120 seconds; Figure 1). Most adolescents who received ECT were taking one less medication one year after ECT than they were at initiation of ECT, and the average change in number of medications prescribed pre- and one year post-ECT was 0.74 (Figure 2).

ECT appeared to be effective in reducing symptoms of affective (major depressive disorder, bipolar affective disorder), psychotic (psychosis NOS, schizophrenia, schizoaffective psychosis), and other disorders (schizoaffective disorder, depression with psychotic features, catatonia, anxiety disorders) as measured by Clinical Global Impression scales of Improvement and Improvement on independent retrospective analysis by a board-certified Child and Adolescent Psychiatrist and a PGY-2 Psychiatry resident (Figure 3).

The most commonly described side effect from ECT treatment was nausea (15%, n=7), followed by headache (13%, n=6), post-emergence agitation (9%, n=4), spontaneous seizure (4%, n=2), status epilepticus (2%, n=1), and urinary retention (2%, n=1; Figure 4).

Conclusions: These data suggest ECT practice in adolescents is relatively similar to adult ECT practice as it relates to electrode placement, settings, number of treatment sessions per series and reported side effects. Overall, seizure duration in adolescents tends to be more frequently prolonged compared to adults receiving ECT. Adolescents receiving ECT were eventually diagnosed with personality disorders approximately 13% of the time upon reaching adulthood.

Table 1. Demographic and Treatment Characteristics of Adolescents ECT Patients

<table>
<thead>
<tr>
<th>Sex</th>
<th>Male (n=18)</th>
<th>Female (n=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Average 16.7</td>
<td>Range 12-19</td>
</tr>
<tr>
<td>Race</td>
<td>Caucasian 91% (n=41)</td>
<td>Asian 2% (n=1)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2% (n=1)</td>
<td></td>
</tr>
<tr>
<td>Electrode Placement</td>
<td>Bitemporal 67% (n=31)</td>
<td>Right Unilateral 24% (n=11)</td>
</tr>
<tr>
<td>Placement</td>
<td>Bitemporal + Right Unilateral 7% (n=3)</td>
<td>Bilateral 2% (n=1)</td>
</tr>
<tr>
<td>Final ECT Setting</td>
<td>Medial 30</td>
<td>Range 10-220</td>
</tr>
<tr>
<td>Number of Treatments per Patient</td>
<td>Average 10.4</td>
<td>Standard Deviation 4.5</td>
</tr>
<tr>
<td>Patients with Incidence of Prolonged Seizure (EEG Seizure in sec)</td>
<td>&gt;180 16</td>
<td>121-180 12</td>
</tr>
</tbody>
</table>
| Prolonged Seizure Events (EEG Seizure in sec) | >180 28 | 121-180 14 | 61-120 16

Figure 1. Seizure Duration (EEG) by Patient Age

Discussion

- Of the 46 pediatric patients treated with ECT over the past 20 years, 29 had 1-year follow-up data.
- Despite controversy on ECT use in adolescents, these data suggest it is a safe, reasonably well-tolerated and effective treatment for the most severely ill adolescents resistant to pharmacotherapy and psychotherapy. Although improvement with ECT is robust, patients remain moderately ill (by CGI-Score levels), suggesting that post-ECT support and treatment interventions need to be carefully formulated.

Conclusions

- Although improvement with ECT is robust, patients remain moderately ill (by CGI-Score levels), suggesting that post-ECT support and treatment interventions need to be carefully formulated.

References

Schneekloth TD, Rummans TA, Logan KM. Electroconvulsive therapy in adolescents. Consults Ther 1993;3:1158-1166