JACOBS PUBLISHERS

OPEN ACCESS

Jacobs Journal of Psychiatry and Behavioral Science

Editorial

Electroconvulsive Therapy in an Adolescent Patient with Treatment-Refractory Depression and Underlying Anxiety: A Case Report

Samuel B. Reynolds*[1], Laurence P. Karper[1] MD, Edward R. Norris[1] MD

[1]*University/Organization: LVPG Consultation Liaison Psychiatry*

**Corresponding author:* *Samuel B. Reynolds, MD, Vice Chair, Department of Psychiatry Education and Research, University/Organization: LVPG Consultation Liaison Psychiatry, 1251 S Cedar Crest Blvd, Suite 202 A, Allentown, Pennsylvania 18103-6214, USA, Tel: 610-402-5766; Email: Samuel.Reynolds@lvhn.org*

Received: *07-11-2015*

Accepted: *05-30-2016*

Published: *06-08-2016*

Abstract

Electroconvulsive therapy (ECT) is used most often in adult patients with treatment-refractory depression, but its utility in adolescents is seldom employed clinically. The objective of this report is to present a case of treatment-refractory depression in a 17 year-old female who, after repeatedly failing medication trials, would ultimately benefit tremendously from ECT. Research into the use of ECT in adolescents is also explored here, with a specific focus on its efficacy in treating depression, and on any reported adverse effects. Recently-published studies have generally shown positive outcomes in adolescents who have undergone the procedure, with notable adverse effects, such as transient memory impairment, occurring in only a small portion of observed patients. We strongly feel that these research findings, as well as the success of the procedure in our own patient, point to ECT as a safe and effective treatment modality in adolescents with depression refractory to medical management.

Keywords: Adolescents, Anxiety; Depression; Electroconvulsive

Abbreviations

ECT: Electroconvulsive Therapy;

CBT: Cognitive Behavioral Therapy;

SGA: Second Generation Atypical Antipsychotic;

SSRI: Selective Serotonin Reuptake Inhibitor;

SNRI: Selective Serotonin Norepinephrine Reuptake Inhibitor

Introduction

ECT is a long accepted treatment for medication resistant mood disorders. This treatment is reserved for individuals who have failed multiple trials of medications from various classes, including SSRIs, SNRIs, SGAs, and mood stabilizers. Its use, however, is controversial in adolescents. We present a case of treatment-refractory depression with underlying anxiety and pathological grief in an adolescent patient that was managed effectively with ECT, and an associated review of the literature relevant to this topic.

Materials and Methods

Patient's history of present illness was provided by her and her mother throughout the duration of care. Past medical history, including medication dosage and route of administration, was accessed using both Centricity™ and Epic electronic medical record systems. Literature review was conducted via The National Center for Biotechnology Information at PubMed.org using the search terms "adolescents", "electroconvulsive", "therapy", "refractory" and "depression". A separate search was also conducted by adding the term "adverse" to the above list of "terms". Individual papers from these searches were then selected for reference in this case report based on applicability to this case, the goal being to focus the scope of the report to a specific condition being managed with electroconvulsive therapy in a particular patient population by age – i.e. adolescents receiving ECT with treatment refractory depression. Additionally, use of the term "adverse" allowed for the inclusion of studies that focused on the potential for unwanted side effects, which is a component of the discussion section of this report. Within the discussion of adverse effects in adolescents is also a brief section on adults, so the search was expanded accordingly to include "adults" for that portion. Finally, practice parameters published by The American Academy of Child and Adolescent Psychiatry, though outside of the literature review conducted with the above-specified search terms, have been included and referenced in order to provide support for key discussion points.

Case Report

A 17 year-old female was admitted to the adolescent behavioral health clinic to address her grief and chronic depression. The patient described a waxing and waning history of depression that began 3 years ago when her stepfather passed away, which had now worsened with the recent murder of her biological father. On initial intake and examination, the patient was dysphoric, poorly engaged, and was experiencing psychomotor retardation. She also admitted to feeling tremendous guilt over the death of her biological father, and was preoccupied with constant ruminations of internal grief and notions that she was responsible for his untimely passing. These ruminations contributed to her anxiety, and further complicated her psychiatric management. The patient's mother also had a history of depressive episodes treated by venlafaxine XR. Despite her struggling from a psychiatric perspective, the patient's mental status examination was within normal limits.

Regarding her inpatient treatment, a variety of non-pharmacologic approaches were provided throughout the patient's admission to the adolescent behavioral health unit, including cognitive behavioral therapy (CBT), which allowed her to address cognitive distortions and feelings of guilt for her father's death. One aspect of her CBT, for example, consisted of group therapy, where the patient and other adolescents admitted to the unit worked with each other and with occupational therapists in daily 1-hour sessions. Here, patients were encouraged not only to share their own experiences with depression, but also to engage in peer-to-peer interaction they might otherwise be lacking outside the unit. These sessions provided the patient with an outside perspective, and helped her better understand that she was not responsible for her father's tragedy. CBT also involved personal psychotherapy, where the patient met regularly with behavioral therapists in order to learn about her own illness, and for the staff to assess her response to medication changes. Lastly, and perhaps most importantly for this specific patient, were regular family meetings held within the unit, where both providers and the patient's family could discuss future directions of care. The patient, overall, responded well to non-pharmacologic approaches, but always regressed to her depression after short periods of improvement and thus failed in making any meaningful therapeutic progress.

Non-pharmacologic management was also challenging, as the patient failed on several psychiatric medications from multiple classes prior to undergoing ECT. Her primary care provider, 19 months before her being seen by adolescent behavioral health, started the patient on escitalopram, 10 mg daily by mouth, which was continued for 3 months without improvement in her depressive symptoms. Her dose was increased to 20 mg and continued by the same physician until her admission to the behavioral health unit over 1 year later. Recognizing her failure to improve on this SSRI, her psychiatrist began venlafaxine XR, 37.5 mg daily by mouth, and risperidone, 0.5 mg twice daily by mouth, to treat both her depression and anxiety. This venlafaxine XR was increased to 75 mg the following day and to 112.5 mg four days later at the same frequency and route of administration. Risperidone, meanwhile, was increased to 2 mg by mouth daily, 0.5 mg in the morning and 1.5 mg at night. Her venlafaxine XR would be ultimately be increased gradually throughout her admission (for a total duration of nearly 11 weeks), including while receiving ECT, and reaching as high as 262 mg daily, with no notable improvement in her depressive symptoms. Risperidone, however, would be discontinued after 7 weeks. Additional medication trials were also performed prior to administering ECT, including Adderall 10 mg by mouth once daily in the morning as an adjunct to venlafaxine XR, clonazepam 0.25 mg by mouth three times daily to assist with anxiety, and zolpidem 7.5 mg by mouth nightly for sleep. Despite these added medications, continued disturbances in sleep as well as near-constant anxiety after 7 weeks of therapy in the adolescent behavioral health unit prompted providers to gradually taper these medications in search of a more effective anti-depressive regimen. One of these medications was asenapine, administered at 0.5 mg twice daily by mouth with the goal of improving mood lability. The hope here was that a combination of asenapine and her venlafaxine XR, which was still being given at 150 mg daily by mouth, would be effective

in controlling depression. Similar to her previous medication trials, however, this combination proved ineffective after 1 week of therapy, yielding no sustained reduction in either depressive symptoms or suicidal ideations. Furthermore, having now turned 18, she was no longer eligible for treatment in the adolescent clinic and required transfer to the adult behavioral health unit, where she admitted, now almost 8 weeks since her initial hospitalization.

On initial evaluation in the adult unit, the patient's current anti-depressive medication regimen was evaluated, as well as her complete psychiatric treatment history, which included medications from the SSRI, SNRI, SGA, and mood stabilizer classes. Subsequent psychiatric evaluation revealed the patient to still experiencing mood dysphoria, suicidal thoughts and continued disturbances in sleep. It was concluded from this information that the patient was suffering from treatment-refractory depression, and that ECT would be a reasonable therapeutic option. The patient's clinical picture was then reviewed with her and her family, with a specific focus on the benefits of ECT as well as the potential for any adverse effects. She consented shortly thereafter to undergo the procedure.

to a maximum overall score. The patient, now having demonstrated a reliable baseline of intact function across multiple cognitive domains, was prepared for ECT. Over the next two weeks, she underwent 6 treatments of bilateral electroconvulsive therapy, alternating approximately every other day, and was observed to make a marked clinical recovery, during which time she reported substantial improvements in mood as well as a major decrease in suicidal ideations. Decreases in self-rated depression scores were also noted during this period, as shown in Figure 1.

Patient was asked by nursing staff in both the adolescent and adult behavioral health (BH) units to rate her depression from 1-10 (1 being the lowest, 10 being the highest) at regular time intervals throughout admission. Timing of both admission to and discharge from the adult behavioral health unit is indicated by blue arrows while the six bilateral ECT treatments are indicated by red arrows.

The patient made a remarkable recovery following ECT, both from a therapeutic standpoint and in terms of maintaining her high level of cognitive function.

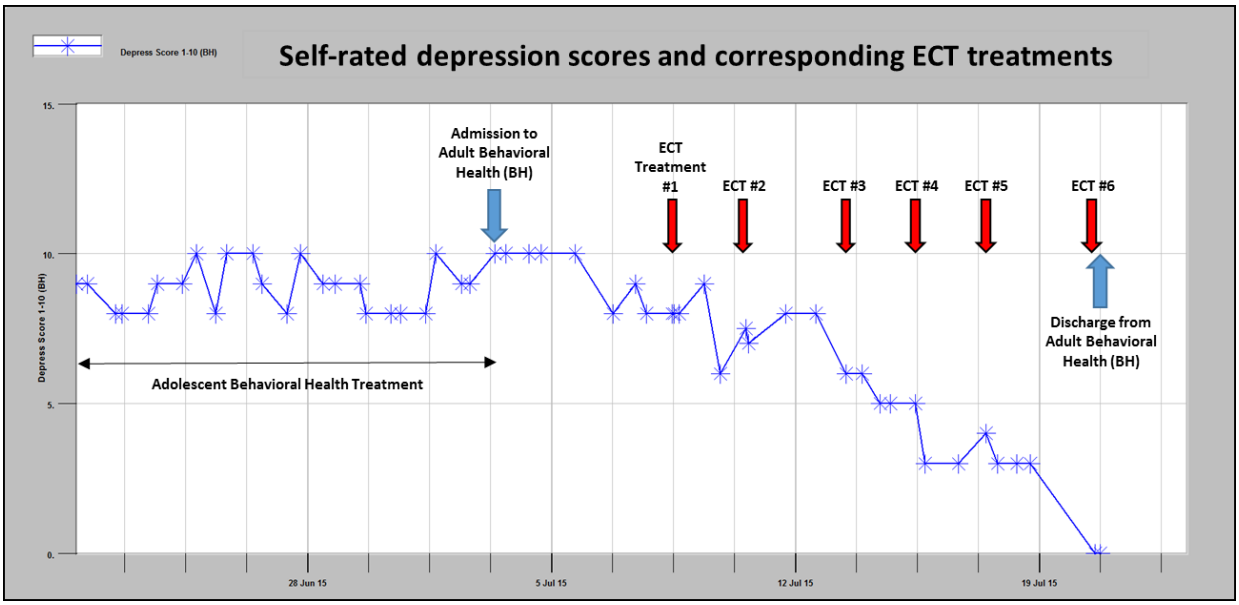

Figure 1.

Prior to receiving ECT, a detailed evaluation was performed in order to assess the patient's cognitive function. This evaluation would be used a baseline for comparison following the procedure in order for providers to determine how well ECT was tolerated by the patient. Several key domains were assessed and assigned a score: abstract reasoning, attention, executive function, memory (immediate and delayed) and orientation. The score for each was noted, and a final score was obtained by the summation of each individual domain. After repeated tests to ensure reliability of the results, the patient had scored the maximum number of points in each domain, amounting

The patient not only reported minimal depressive symptoms but was also increasingly hopeful for a life outside the psychiatric unit. Cognitive function was assessed daily over her two weeks of ECT treatment using the same five cognitive domains (abstract reasoning, attention, executive function, memory, orientation). Her scores, both for each domain and in total, remained unchanged throughout therapy. The procedure, therefore, was effective in controlling her treatment-refractory depression and was, at the same time, safe from any adverse effects on cognition. It should also be noted that adverse effects reported in the literature outside of cognitive impairment

were also not seen in our patient, including cardiac events such as asystole or ventricular tachycardia, postictal agitation and hematuria, to name a few. The patient was discharged 18 days after admission to the adult unit and 13 days after starting ECT, following an almost 8 full weeks of management solely with psychiatric medication.

Discussion

The patient discussed in this case report presented a unique challenge to her providers, as adolescents with major depression traditionally respond well to a combination of medication and psychotherapy. Her recurrent depression was refractory not only to several SSRIs, but also to various drugs from the SNRI, SGA, and anxiolytic classes, making her a candidate for ECT. This begs the question: How effective is ECT in adolescent patients who have experienced or are experiencing major depression, and, more importantly, how safe is it?

The most recently published practice parameters of the American Academy of Child and Adolescent Psychiatry were issued in 2004, where indications for ECT in adolescents were laid out across three categories: diagnosis, severity, and lack of treatment response. It was further explained in these parameters that criteria from each category must be met prior to consideration for ECT. In the diagnosis set of criteria, for example, indications included severe depression and schizoaffective disorder. For severity of symptoms, the parameters stated that "the patient's symptoms must be severe, persistent, and significantly disabling", and went on to specify suicidality and psychosis as such examples. Lastly, a lack of treatment response is defined by the AACAP as a failed response to two trials of the appropriate FDA-approved psychopharmacological medications combined with the appropriate therapeutic modalities. The AACAP also described the efficacy of ECT as a procedure, which was largely supported by a multitude of previously published retrospective and review studies. The response rate of ECT in these reported studies was consistently greater than 50%, and the procedure was demonstrated to be effective not only in managing major depression, but also in treating illnesses such as schizophrenia, head injury, and bipolar disorder, findings which are suggestive of ECT having broad therapeutic potential across a wide spectrum of adolescent psychiatric illness [1].

While the AACAP practice parameters are effective in bringing together the findings from studies prior to 2004, a full evaluation of the efficacy of ECT in the context of modern psychiatry requires exploration of more current research. A 2015 study by Zhand et al. published in the Journal of electroconvulsive therapy, for example, featured a case series examining the potential for ECT as an efficacious treatment in adolescents with treatment-refractory depression. The authors examined 13 adolescent patients between ages 15 and 18 who received, on average, 14 total ECT sessions (SD = 4.5). The patients were assessed using the Beck Depression Inventory-II before and after ECT, with an average reduction of 0.96 points (95% CI, -1.31 to -0.67, $P < 0.001$) noted for each treatment. Overall, 10 of the 13 patients studied (77%) were found to have made significant clinical improvement, leading Zhand et al. to conclude that treatment-refractory depression in adolescents could potentially be treated with ECT [2].

Jacob et al. [2] conducted a similar study, where her team sought to explore the role and practice of ECT in both children and adolescents who had been cared for in a tertiary center. The study employed a retrospective chart review spanning 10 years of 22 patients (11 boys, 11 girls), age 16 and below, who had undergone at least one ECT treatment. And of these 22 patients, 12 (54.5%) were being treated for catatonic symptoms. The patients were assessed according to severity of their illness and improvement in such illness using the Clinical Global Impressions (CGI) scale. Analysis found ECT to be efficacious in 17 of 22 (77.3%) patients enrolled, with no immediate adverse effects noted in any subjects. Of the original patients reviewed, approximately 68% were examined during follow-up care and were not found to have experienced long-term adverse outcomes [3]. According to these results, it is reasonable to conclude that ECT is both a safe and efficacious therapy for child and adolescent patients with catatonic symptoms in the psychiatric care setting. And while this is encouraging, not all patients with major depressive disorder have catatonic symptoms (the patient in our presented case did not), so it is difficult to make a direct comparison between this study and our own.

The discussion in the literature regarding adverse effects is also important, not only to our study but to all patients in the adolescent age group receiving ECT. The aforementioned AACAP parameters, in addition to describing ECT and its utility in adolescents, also provided information regarding adverse effects, which included (and still include today), outcomes as severe as seizures and memory impairment, as well as those more minor in nature, such as headache and nausea [1]. Even earlier than the publication of these parameters, Cohen et al. [4] assessed the long-term cognitive function of 10 adolescents with severe mood disorder who had been treated with bilateral ECT, with a control group consisting of 10 psychiatric patients matched for age, diagnosis, and gender. After completion of the final ECT treatment, each subject was evaluated using both the California Verbal Learning Test and Squire's Subjective Memory Questionnaire. What Cohen and his team found was that scores on both of these cognitive assessment tools did not differ between the control and treatment groups. And while 6 of 10 patients in the ECT treatment group did report memory loss immediately after undergoing ECT, only one reported long-term cognitive memory impairment. The researchers were therefore able to conclude that ECT administered to adolescents with severe mood disorder does not result in long-term cognitive impair-

ment [4]. Similar adverse effects were noted in the more-recent Zhand et al. [2] study, with 11 of 13 patients experiencing "transient subjective cognitive impairment." As indicated in the study's reported results, however, this effect was short-lived and did not lead to permanent cognitive dysfunction [2]. As a final note in the discussion of adverse effects, it is important to recognize similar findings in the even more well-studied adult population. Several recently-published studies comment on the lack of long-term cognitive impairment in adults who have received ECT for treatment-refractory depression. One 2014 study, for example, monitored outcomes in 42 adult patients, all ≥55 years of age, who had been diagnosed with depression and underwent ECT. Using various assessment tools, including the Mini-Mental State Examination, 10 Words Verbal Learning Test and Visual Association Test, researchers were unable to detect any decline in neurocognitive function, both at short-term (1 week) and long-term (6 months) follow-up [5]. Another paper was published in 2010 as a meta-analysis of 2,981 patients across 84 studies, and similarly reported an absence of long-term cognitive abnormalities following ECT, with specific domains such as anterograde memory, executive function and processing speed all being reported as intact compared to baseline [6].

Lastly, we must acknowledge the potential limitations of this case report, one of which is that our patient received ECT shortly after being transferred to the adult behavioral health unit, so it is unclear as to whether or not the drop in her self-rated depression scores was due to ECT or to a change in care setting. We would also like to note that our patient is currently only 15 weeks post-discharge form the adult behavioral health unit, and has yet to be reported on as a psychiatric outpatient. Accordingly, while her response to ECT is encouraging, we cannot at this time comment on her long-term cognitive function, which will be an important aspect of her care moving forward.

Conclusion

In adolescent patients presenting with treatment-refractory depression that has not responded to repeated trials of anti-depressant medication from various classes of psychiatric pharmacotherapies, ECT should be considered as a safe and effective means of therapy, with the potential for substantial clinical recovery and limited adverse outcomes.

Acknowledgements

We have no financial disclosures or conflict of interest to report. We would like to acknowledge John F. Campion, MD, for his clinical care and support.

References

1. Ghaziuddin N, Kutcher SP, Knapp P, Bernet W, Arnold V et al. Practice parameter for use of electroconvulsive therapy with adolescents. J Am Acad Child Adolesc Psychiatry. 2004, 43(12): 1521-1539.

2. Zhand N, Courtney DB, Flament MF. Use of Electroconvulsive Therapy in Adolescents With Treatment-Resistant Depressive Disorders: A Case Series. J ECT. 2015, 31(4): 238-245.

3. Jacob P, Gogi PK, Srinath S, Thirthalli J, Girimaji S et al. Review of electroconvulsive therapy practice from a tertiary Child and Adolescent Psychiatry Centre. Asian J Psychiatr. 2014, 12: 95-99.

4. Cohen D, Taieb O, Flament M, Benoit N, Chevret S et al. Absence of cognitive impairment at long-term follow-up in adolescents treated with ECT for severe mood disorder. Am J Psychiatry. 2000, 157(3): 460-446.

5. Semkovska M, McLoughlin DM. Objective cognitive performance associated with electroconvulsive therapy for depression: a systematic review and meta-analysis. Biol Psychiatry. 2010, 68(6): 568-577.

6. Verwijk E, Comijs HC, Kok RM, Spaans HP, Tielkes CE et al. Short- and long-term neurocognitive functioning after electroconvulsive therapy in depressed elderly: a prospective naturalistic study. Int Psychogeriatr. 2014, 26(2): 315-324.