Case Report

Safety and Effectiveness of Electroconvulsive Therapy in Anorexia Nervosa and Depression – A Case Report

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Abstract

Background: Anorexia nervosa (AN) mainly affects adolescents and young adults. AN is highly associated with comorbid psychiatric disorders such as depression, which makes treatment difficult. Pharmacological options are limited because selective serotonin re-uptake inhibitors (SSRIs) are less effective in underweight individuals. Electroconvulsive therapy (ECT) is an important treatment option for depression, but is rarely considered in patients with AN. Clinicians wary of using ECT for treating patients with AN, because they question whether it is safe and effective

in these patients. Is this caution justified?

Case presentation: We describe a 21-year-old woman with restrictive AN and depression, with suicidality. Trials of psychotherapy for depression and various antidepressants were unsuccessful and her condition deteriorated. She was admitted to hospital several times because of the precarious state of her health due to the eating disorder and serious suicide attempts. ECT was started because of the severe suicidality and her restrictive eating pattern. There were no complications, and the eating disorder and depression improved relatively soon after the start of treatment. ECT provided a breakthrough in the treatment of an unresponsive, life-threatening situation, such that follow-up therapy could be started. The eating disorder regressed several months after ECT.

Conclusions: Case reports have their limitations and there is no unequivocal evidence that ECT is effective for AN with comorbid depression. Yet the literature suggests that ECT should be considered in a life-threatening situation or when treatment possibilities are exhausted. AN and underweight are not contraindications for ECT, although medical screening before treatment is highly recommended. The long-term effectiveness of ECT has yet to be established.

Keywords: Electroconvulsive Therapy; Anorexia Nervosa; Major Depressive Disorder; Case Report; Treatment

Abbreviations: AN: Anorexia Nervosa; ASD: Autism Spectrum Disorder; BMI: Body Mass Index; CBT: Cognitive Behavioural Therapy; ECT: Electroconvulsive Therapy; EMDR: Eye Movement Desensitization and Reprocessing; HDRS: Hamilton Depression Rating Scale

1. Introduction

Eating disorders are common among adolescents and young adults, and girls and young women aged 15–25 years account for 95% of all patients with eating disorders in industrialized countries [1]. Current treatments include psychotherapy, nutritional counselling programmes, and medication [2], with weight restoration and stabilization of the patient's physical condition as primary treatment goals [1, 3]. Cognitive behavioural therapy is the psychotherapy of first choice and is often effective [4]. However, it takes time, active participation and (self) perception in order to be productive. Moreover, underweight and mood instability often limit the effects of treatment [5]. Eating disorders have a high risk of relapse, leading to chronicity [6]. Anorexia nervosa (AN) is potentially the most life-threatening psychiatric disorder, with a mortality rate of 5.1 per 1000 person–years [7].

Eating disorders are often accompanied by mood, personality, or other psychiatric disorders [1]. The prevalence of severe depression is four times higher in patients with eating disorders than in patients without eating disorders [8]. Moreover, the severity of depression increases the risk of suicide and diminishes the likelihood of recovery from the eating disorder [9]. Pharmacotherapy may be useful in the treatment of comorbid disorders in AN, such as depression [10]. However, treatment with selective serotonin re-uptake inhibitors (SSRIs) for depression is less effective in the presence of AN [11], because the uptake of serotonin is inadequate in underweight patients [12].

Dutch guidelines recommend electroconvulsive thera-

py (ECT) for depression with psychotic features, treatment-resistant depression, or schizophrenia or mania that is inadequately responsive to pharmacotherapy. Catatonia, malignant antipsychotic syndrome, Parkinson's disease, delirium, and schizoaffective disorders are less common indications for ECT. Suicidality is not necessarily an indication for ECT, but the presence of comorbid depression strengthens the indication [13]. Although a meta-analysis has shown ECT for depression to be less effective in patients younger than 50 years than in patients older than 50 years [14,15], ECT is still recommended in adolescents with severe, or even psychotic, depression with life-threatening symptoms or treatment resistance [13].

There have been no randomized clinical studies of the effectiveness and safety of ECT in AN. The 'Eating disorders' guideline of the American Psychiatric Association concluded that ECT was not effective as treatment for AN, except when used to treat a comorbid condition [16]. Safety is a key issue because of the physical frailty of patients with AN. This makes clinicians wary of using ECT to treat patients with AN. The Dutch guideline emphasizes that anticipated benefits should be carefully weighed against the physical burden of ECT. Medical screening before treatment is advised with a view to treating and stabilizing underlying physical health, for example, with fluid and electrolyte supplementation [13]. In this article, we describe the effect and safety of ECT in a 21-year-old woman with AN and depression. Additionally, we give a review of relevant literature on this subject.

2. Case Report

The patient was a 21-year-old Dutch woman with a history of restricting type AN and depression, with suicidality. Depression was initially the main problem, and the patient received various forms of psychotherapy from 15 years of age, such as cognitive behavioural therapy (CBT), eye movement desensitization and reprocessing (EMDR) for traumatic memories, and family therapy, both inpatient and outpatient, all without effect. She was treated with several antidepressants – fluoxetine (up to 40 mg), clomipramine (up to 150 mg), venlafaxine (up to 225 mg), and nortriptyline with additional lithium – achieving adequate blood levels and treated for an adequate time, but again without a relevant improvement in mood. Although her symptoms of AN slowly became more numerous and more severe, they became the dominant problem only in the last 2 years. Worsening AN and depression led to the admission of the patient, who had a BMI of 11.5 kg/m^2, to the psychiatric unit of a general hospital, where she underwent forced feeding. She was later admitted to a clinic for eating disorders. During this period, she was also diagnosed with an autism spectrum disorder (ASD) according to the current guidelines. Shortly after she was discharged to home, on the condition that she maintained a minimum weight (BMI 14 kg/m^2), she overdosed on paracetamol and was re-admitted to hospital. Because her BMI was 12 kg/m^2, a weight recovery programme was started, but the patient did not follow the programme and refused to participate. She again attempted suicide with 150 tablets of paracetamol (500 mg), and was admitted to the intensive care unit with severe liver enzyme abnormallities (ALAT and ASAT ≥7000 U/l).

The patient had already approached the Expertise Centre Euthanasia, but her request was denied on the grounds that there were still treatment possibilities, such as ECT. In consultation with the patient and her parents, it was decided to start ECT because of the

patient's severe depression (Hamilton Depression Rating Scale [17] score of 27), severe suicidality, and malnutrition, with BMI 12 kg/m^2 before the start with ECT. Medical screening before treatment was started revealed no abnormalities (except for the raised liver enzymes and low potassium levels, for which supplements were given) Twelve bilateral ECT sessions were given, two per week (Thymatron IV with anaesthesia with etomidate and succinylcholine). According to the Dutch ECT guideline [13], the patient age method (2/3 × age) was used initially – treatment was started at 15% energy, but as the patient did not have an epileptic seizure this was increased to 30% and subsequently 80%. A seizure was curtailed with intravenous midazolam (2.5 mg). The energy was decreased to 40% over the three subsequent sessions, with a mean motor seizure duration on EEG of 50 seconds. Olanzapine (10 mg), vitamins, potassium chloride, and supplementary feeding were continued during treatment. The patient was given ibuprofen (400 mg) for headaches experienced after ECT. The day before the tenth session, the patient was started on nortriptyline (25 mg); the dose was increased to 50 mg after 2 days. Heart condition was monitored and remained within the normal range.

During treatment, the patient's mood improved and she met her dietary intake of minimally 1800–1900 kcal/day without coercion, something that had not occurred before ECT. Although the anorexic thoughts did not disappear, the patient found them less troublesome. Her BMI had increased to 15 kg/m^2 half way through the course of therapy and her HDRS score had decreased to 18, a score indicative of 'moderate' depression, an improvement of 33%. The HDRS score stabilized thereafter, and ECT was stopped. While the core symptom 'depressive mood' did not improve, the core symptom 'anhedonia' did. Scores for 'agitation', 'anxiety' (both physical and mental), physical symptoms in general, and gastro-intestinal symptoms decreased. The mood improvement was clinically impressive – the patient felt less 'down', was quicker in thought and action, and made more and more-intensive social contact.

Once discharged to home, the patient refused to have her weight checked but reported that her weight had increased after ECT completion. She had had a healthy BMI for several months. Two months after the end of ECT, the patient had a HDRS score of 20 (26% improvement from baseline) with suicidal thoughts, but a diminished intention to commit suicide. After several months of intensive psychotherapeutic guidance, the patient started a treatment at a centre specialized in autism. This was only possible because there had been no need for crisis intervention, and the patient's mood and eating problems had stabilized. However, several months after the start of treatment, the patient started to restrict her food intake and lost weight again. Her BMI was not known because she refused to have her weight checked, but her weight loss was visible for clinicians.

3. Discussion

This patient with severe depression, suicidality, a restrictive eating pattern, and a low BMI was treated with ECT without complications despite her physical condition. The use of ECT provided a breakthrough in what was a life-threatening situation. An improvement of mood, with a decrease in suicidality, and an improved eating pattern, was seen soon after the start of ECT. It is possible that the improved eating pattern supported the improvement in mood, such that improvements in the two conditions may be assoc-

iated. Furthermore, depression may be difficult to diagnose in the context of starvation related dysphoria. In our case however, depression was initially the main problem and not only in relation to the eating disorder. Shilton et al. also reported this rather unclear association between changes in depression and eating disorder symptomatology [18]. The improvement of the patient's depression and eating disorder made it possible to start other treatments, without crisis intervention being the main option [21]. Thus, ECT is worth considering in similar severe, life-threatening situations. The likelihood of achieving stable and long-lasting remission with ECT is smaller in patients younger than 50 years than in older patients [14,15], as proved to be the case here. Despite this, the patient's response was remarkable in that such an improvement had not been seen earlier. This enabled the patient to actively participate in an autism treatment programme.

Our findings prompted us to search the literature for studies of the effect and safety of ECT in patients with AN and depression. In October 2021, we searched PubMed, PyscINFO, and the Cochrane Library, using the MeSH terms 'anorexia nervosa', 'feeding and eating disorders', 'electroconvulsive therapy', 'electroshock', and 'depressive disorder'. Titles and abstracts from the 48 results were screened, and full texts of articles that met the inclusion criteria were reviewed. Criteria for inclusion were English language articles that described administration of ECT to patients with active symptoms of a diagnosed AN, with or without comorbid psychiatric disorders. Details extracted from each article included the patient's psychiatric diagnoses, age, medical comorbidities, details of ECT treatment, reported outcome measures of treatment, adverse outcomes of treatment, and BMI before and after treatment.

3.1 Effect of ECT on AN and depression

In their systematic review, Pacilio et al. described 13 patients with AN (mean age 32 years, BMI 11–16.8 kg/m^2) and their own case report [19]. Most patients had comorbid depression. The BMI increased by a mean of 3.36 kg/m^2 after an average of 19 bilateral ECT treatments. Shilton et al. described 30 patients (mean age 16 years, BMI 11.8–17.1 kg/m^2) with AN and depression [18]. Both conditions improved after an average of 17 bilateral ECT treatments, but 53% of the patients were readmitted in the year after ECT because of worsening depression. Andersen et al. described a 14-year-old girl with AN and depression [8]. Depressive symptoms, measured with the Children's Depression Rating Scale, improved (score decreased from 43 to 17) and her BMI increased (from 17.1 to 21.78 kg/m^2) after 13 inpatient and 22 outpatient ECT sessions. Van der Lelie et al. found ECT to improve the mood and eating pattern of a 17-year-old patient with AN and depression [20]. However, the eating disorder and depression regressed immediately after the end of ECT, prompting the restart of ECT, followed by transient maintenance ECT. The patient's BMI increased from 14.35 to 18.59 kg/m^2 during ECT treatment, and she became motivated to follow outpatient treatment, which led to a further improvement.

3.2 ECT for AN without psychiatric comorbidity

Two case reports described the effects of ECT on AN in the absence of accompanying psychiatric disorders. Naguy et al. reported that a 16-year-old girl (BMI 16 kg/m^2) gained 4 kg in weight after six ECT sessions, although her body image remained distorted [21]. Despite this somewhat limited effect, the authors advocated using ECT in patients with severe AN and life-threatening symptoms, even in the absence of

comorbid depression. In contrast, Duriez et al. found ECT to be ineffective in a patient with severe AN, even though the patient's BMI was 19.6 kg/m^2 after treatment (the baseline BMI was not reported) [22]. The limited published information means that, as yet, there is little evidence that ECT is effective in AN with-out further psychiatric comorbidity. Although caution is advised, ECT could be considered in patients with AN without other psychiatric disorders if their condition is serious, life-threatening, and therapy refractory.

3.3 Can conservative use of ECT in AN and comorbid depression be justified?

In contrast to the above, it is more difficult to justify resistance to the use of ECT in patients with AN and comorbid depression. Indeed, it can be questioned whether ECT should not be started earlier in these patients than in patients with depression alone, given the limited effect of antidepressants in AN. The only available, retrospective, study in this area suggests that clinicians should perhaps start ECT earlier than previously thought in patients with AN, especially if the patient fails to gain weight because of severe depression and/or suicidality [18].

3.4 Safety

Serious side effects of ECT were not reported in the published case reports and were not seen in our patient. AN is not a contraindication for ECT [13]. As advised by the Dutch guideline, we monitored the physical condition of our patient before and during ECT and administered electrolytes. In the cases reported in the literature, a stable physical condition, with or without treatment of abnormalities, was a prerequisite for ECT. Recognized side effects of ECT, such as headache, nausea, and mild memory problems, were reported in the published case reports. Our patient only experienced transient headache.

3.5 Long-term effect

The long-term effectiveness of ECT on depression and AN may prove disappointing. Shilton et al. reported that 53% of their patients were readmitted in the first year after ECT, mainly because of deteriorating depression [18]. Van der Lelie et al. also reported that depressive symptoms became worse shortly after the end of ECT, necessitating the start of maintenance ECT [20]. We found that while our patient's eating disorder regressed several months after the completion of ECT, the stabilization of mood was sustained. This not only emphasizes the as-yet unclarified relationship between depressive disorders and eating disorders, but also makes it clear that ECT should be used to achieve a more rapid remission of life-threatening symptoms rather than as a treatment for AN.

3.6 Limitations of case reports

There have been no comparative studies of ECT in AN but only case reports, so there is a risk of publication bias. Moreover, in these case reports patients nearly always had comorbid depression. About ECT to treat AN in the absence of psychiatric comorbidity has hardly been published. Another disadvantage of case reports is that data are not collected systematically and are often incomplete. Moreover, with the exception of the study of Shilton et al., most studies had a short follow-up. When reported, symptoms often regressed with time after ECT.

4. Conclusions

The treatment of AN is often complex and the likelihood of relapse is high. Especially if treatment is complicated by comorbid depression and suici-dality. Although case studies have their limitations and there is no clear evidence of the effectiveness of ECT in AN

with comorbid depression, findings suggest that ECT should be considered in these patients with life-threatening symptoms, and espe-cially when there is comorbid depression. We advocate that a systematic study of the effect of ECT be carried out to establish the relevance of ECT in patients with AN and depression. While AN and low body weight are not contraindications for ECT, they require extra attention. Medical screening before ECT is recommended to achieve optimal treatment and stabilization of physical abnormalities. In this case report, ECT provided a therapeutic breakthrough in a patient in a serious condition with suicidality and an extremely restrictive eating pattern, such that it was possible to start follow-up treatment.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Informed assent and consent have been received from the patient for publication.

Availability of data and materials

All data used are available from the corresponding author upon request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

The case report was written by LS and CH. JB was a major contributor in writing the manuscript. All authors read and approved the final manuscript.

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