

Case Report

A Patient with Major Depressive Disorder Recovered with Repetitive Transcranial Magnetic Stimulation after Electroconvulsive Therapy

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Abstract

The efficacy of electroconvulsive therapy (ECT) is superior to that of repetitive transcranial magnetic stimulation (rTMS), particularly for the treatment of major depression with psychotic features. However, ECT is sometimes terminated for several reasons, including patient refusal. Here, the authors present the case of a 57-year-old woman who recovered from major depression with psychotic features with one course of rTMS after ECT was discontinued due to patient refusal. She had been suffering from depression with psychotic features (e. g., tactile hallucinations) for three years prior to admission. During the most recent episode, she was admitted to the authors' hospital and was eventually treated with one course of ECT; however, there was no change in her reported symptoms. Four weeks later, she refused a second course of ECT but agreed to a course of rTMS therapy. She demonstrated gradual recovery from depression three weeks after the initial rTMS therapy session. She demonstrated significant improvement and was discharged from the hospital after 55 days following the first rTMS session. Although the relationship between ECT and rTMS remains unclear, rTMS may be an option for major depression with psychotic features when the patient does not consent to continuing with ECT.

Article Information

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Introduction

There are various types of brain stimulation used for clinical research and for the treatment of psychiatric disorders. Electroconvulsive therapy (ECT) is an effective and safe treatment for major depressive disorder¹ and it is covered by health insurance in Japan. In this treatment, which is done under general anesthesia, small electric currents are passed through the brain, intentionally triggering a brief seizure. Alternatively, repetitive transcranial magnetic stimulation (rTMS) may be used to treat antidepressant-resistant depression, and is approved for off-label use in Japan.² rTMS is a noninvasive technique for modulating cortical and subcortical function through the use of rapidly changing electromagnetic fields generated by a coil placed over the scalp.³ The efficacy of ECT is superior to that of rTMS, particularly for treating major depression with psychotic features.⁴ However, ECT is sometimes terminated for several reasons, including adverse side effects and patient refusal. Here, the authors report the case of a patient who recovered from major depression with psychotic features after responding to rTMS when ECT was discontinued due to patient refusal. Therefore, we consider rTMS to be a valid treatment option for patients with major depression with psychotic features who do not consent to the use of ECT.

Case report

A 57-year-old woman presented with chest tightness and lumbago. She consulted a physician who found no evidence of any physical abnormalities. She gradually presented with a depressive state, characterized by agitation and sadness. Moreover, she began to report tactile hallucinations, stating: "There is a balloon, a pair of scissors, a ball, or something in my waist." She also reported that her lips were moving involuntarily.

After having consulted several other clinics over the past 3 years, she visited the authors' hospital accompanied by her husband and was admitted on May 15, year X (day 1). She was diagnosed with major depressive disorder with psychotic features.⁵ Brain magnetic resonance imaging revealed a small lacunar infarction with no evidence of atrophy. Prior to admission, she had been taking 50 mg of duloxetine and 3 mg of aripiprazole per day, with no reduction in symptoms.

Following admission, she was prescribed 45 mg of mirtazapine and 1.5 mg of clonazepam per day and duloxetine and aripiprazole were discontinued; this resulted in a slight improvement in her condition. She was discharged from the hospital on day 65; however, her condition deteriorated, and she was re-admitted on day 98. Because she did not respond to several medications, she underwent one ECT course (comprising nine sessions) from day 135 to day 160. The device used for ECT was the Thymatron System IV (Somatics, LLC, Venice, FL, USA), and the output current ranged from 45% to 60% of the maximum (504 mC). The electrode position was bitemporal, with one electrode is placed on each side of the head at a point 4-cm perpendicular to the midpoint of a line drawn between the external ear canal and the lateral corner of the eye. All sessions resulted in brain wave slowing, and the emergence of spike and wave complex discharges on the electroencephalogram (EEG).

After 4 weeks of observation, her condition remained unchanged. Her physicians recommended a second course of ECT; however, she refused as she stated that she was afraid of going to the operating room and undergoing general anesthesia. She did, however, consent to initiate rTMS therapy in the ward, so an rTMS course (comprising 15 sessions) was performed from day 189 to day 212. The rTMS device used was the Magstim Rapid MRS 1,000/30 (Magstim Company Ltd, Whitland, Carmarthenshire, UK), with a 70-mm figure-eight coil. During each session, a total of 1000 stimuli were applied at 10 Hz for 100% of the motor threshold (MT) to the left dorsolateral prefrontal cortex (DLPFC) and a total of 420 stimuli were applied at 1 Hz for 110% of MT to the right DLPFC. The stimulation site was 5-cm lateral and 5-cm anterior from the Cz, according to the international 10/20 system for EEG.⁶ Her condition remained unchanged until session 10, after which her agitation and sadness were considerably diminished. However, she still had

the mild tactile hallucinations and delusions regarding the sensation of having objects in her waist and involuntary movement of her lips. Although she was permitted to be discharged from the hospital at that time, she preferred to try a few overnight-stay trials at home prior to discharge to make sure that her disease did not relapse when she returned home. She was discharged on day 245. Four weeks after discharge, she reported that she did not feel depressed in her daily life and enjoyed going out for karaoke with her friends. The 17-item Hamilton Depression Rating Scale was administered throughout her treatment with the following scores: 27 on day 135 (ECT session 1), 27 on day 160 (ECT session 9), 25 on day 189 (rTMS session 1), 14 on day 212 (rTMS session 15), and 7 on day 219, showing minimal improvement following ECT, but robust improvement following rTMS therapy.

Discussion

The patient had suffered from severe depression without remission for over three years. The author started a course of ECT and the patient did not respond. The treatment team proposed the second course of ECT, but she refused, stating that she was afraid of going to the operating room and undergoing general anesthesia. The staff provided detailed information regarding the safety of ECT, but she did not consent to additional ECT. It is possible that her depression symptoms, fear of the treatment, and cognitive distortion may have clouded her judgment and contributed to her refusal of the team's recommendation.

Alternatively, she had an insight into her illness, was admitted voluntarily, trusted and relied on the staff, and hoped to be cured. She was eager to receive any treatments except ECT. Although she had suicidal ideations, she never attempted suicide.

The team strongly recommended ECT; however, forcing her to have an unwanted treatment could negatively impact the patient-doctor relationship, which may create a dynamic in which future care is more difficult.

Certainly, drop-out rates do not differ significantly between ECT and rTMS,⁷ and the efficacy of ECT is superior to that of rTMS on major depression with psychotic features.⁴ However, rTMS is less invasive than ECT and may be better tolerated by some patients. Considering the merit of rTMS, she consented to an rTMS course and responded well to it.

The authors cannot presume that rTMS alone was effective; rather, the combination of ECT and rTMS was likely the key to her recovery or perhaps the recovery was spontaneous and was not related to either treatment. Nevertheless, rTMS presumably resulted in certain benefits to her recovery, as her condition did not improve in the 4-week observation period following one ECT course but considerably improved after undergoing rTMS. Moreover, the speed at which her agitation and sadness diminished suggests that this

improvement was not spontaneous or unaided by rTMS.

Although the interaction between rTMS and ECT remains unclear, some studies have reported the use of rTMS and ECT in combination.^{8,9} Further studies are required to clarify the nature of the interaction between them.

The authors conclude that regardless of whether or not the combination of rTMS and ECT is necessary, rTMS may be used in situations in which continuing with ECT is not possible due to a lack of patient consent.

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