

Compulsive skin-picking behavior after deep brain stimulation in a patient with refractory obsessive–compulsive disorder

A case report

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Abstract

Rational: The therapeutic effect of deep brain stimulation (DBS) for refractory obsessive–compulsive disorder (OCD) has been studied, but complications after this treatment have rarely been noted.

Patient Concerns: A 28-year-old man with treatment-resistant OCD received bilateral ventral capsule/ventral striatum stimulation for 12 months.

Diagnosis: Compulsive skin-picking behavior and infection were noted following 12-month DBS treatment.

Intervention: We removed the implanted right-side pulse generator.

Outcomes: The local inflammation and skin-picking behavior gradually improved. The stimulator device was re-implanted 4 months later.

Lessons: We suggest that patients with the OC spectrum should be evaluated for skin-picking behaviors during presurgical and postsurgical follow-up to reduce the infection and device removal rates.

Abbreviations: DBS = deep brain stimulation, OCD = obsessive–compulsive disorder, VC/VS = ventral capsule/ventral striatum.

Keywords: deep brain stimulation, obsessive–compulsive disorder, skin-picking behavior

1. Introduction

The therapeutic effect of deep brain stimulation (DBS) for treatment-resistant obsessive–compulsive disorder (OCD) has

been studied, and the results support that this strategy is therapeutically promising.^[1] However, postsurgical infection has been noted.^[2–6] In this report, we describe a patient with refractory OCD who developed compulsive skin-picking behavior and infection after 1 year of DBS.

Editor: Thomas Polak.

Author contributions: C-HC conceptualized and designed the study and drafted the initial manuscript; H-CT, S-YC, and S-TT provided expert opinions and reviewed the final submitted manuscript; H-CT was in charge of this study, including conducting the data analysis, and critically reviewed the manuscript, and approved the final submitted manuscript.

Funding: This study was supported by a grant from Buddhist Tzu-Chi General Hospital.

Conflicts of interest: The authors report no conflict of interest concerning the materials or methods used in this study, nor concerning the findings reported in this paper.

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Medicine (2017) 96:36(e8012)

Received: 26 June 2017 / Received in final form: 31 July 2017 / Accepted: 5 August 2017

<http://dx.doi.org/10.1097/MD.0000000000008012>

2. Case report

2.1. History

A 28-year-old ethnically Chinese man had an 8-year history of refractory OCD. His main obsessive thought was “the fear of contamination,” and his compulsive behavior included hand washing and using ethanol to sterilize furniture. He was referred to the Neurosurgery Department because of severe symptoms and no response to at least 3 serotonin reuptake inhibitors, cognitive behavioral therapies, and electroconvulsive therapy. He fulfilled the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, diagnostic criteria for major depressive disorder. He had no family history of bipolar disorder.

2.2. Operation

The study was approved by the Institutional Review Board (IRB) of Buddhist Tzu-Chi General Hospital (IRB094–33). After he had discussed DBS treatment with his family and signed the informed consent form, we implanted Medtronic Model 3387 leads (Minneapolis, MN) bilaterally in an area spanning the ventral anterior limb of the internal capsule and the adjacent ventral striatum referred to as the ventral capsule/ventral striatum (VC/VS). Each lead was 1.27 mm in diameter with four 1.5-mm long electrode contacts, and adjacent contacts were separated by a distance of 1.5 mm. The contacts were at the tip of the lead and were numbered from 0 (deepest) to 3 (most superficial). The left

lead was implanted 7.0mm lateral to the midline, 14.7mm anterior to the midcommissural point (MCP), and 4.0mm inferior to the anterior commissure–posterior commissure (AC–PC) plane. The right lead was implanted 7.0mm lateral to the midline, 14.7mm anterior to MCP, and 4.0mm inferior to the AC–PC plane. The AC–PC line was 24.7.

2.3. Methods

We performed psychiatric evaluations preoperatively, postoperatively, and at follow-up visits every 3 months. We used the Yale–Brown obsessive–compulsive scale (Y-BOCS) to evaluate the severity of OCD. Secondary outcome assessments included the Hamilton Depression Rating Scale (HAM-D) and the Global Assessment of Function (GAF) scale.

2.4. Postoperative course

The patient's medications, including propranolol (30mg/d), triazolam (0.5mg/d), bupropion (300mg/d), venlafaxine (150mg/d), and quetiapine (300mg/d), were kept constant. The preoperative Y-BOCS, HAM-D, and GAF scores were 36, 30, and 51, respectively. Two weeks after a brief stimulation test, we selected the following settings considered to be effective because they improved his symptoms: bilateral contact 2, 2 to 4V, pulse width 210 μ s, and stimulation frequency 130Hz.

At the follow-up 1 year after implantation, his Y-BOCS, HAM-D, and GAF scores were 25, 30, and 61, respectively. However, signs of minor inflammation (an erythematous plaque of approximately 1.5cm²) were noted over the right pectoral area where a Kinetra pulse generator (Medtronic, Dublin, Ireland) had been implanted. He had no fever, and laboratory findings revealed a normal complete blood count. An antibiotic ointment was prescribed to treat the infection. However, 1 month later, the inflammation had progressed. He was anxious that the implanted device seemed not to be fixed in his body, and that it was movable and easily infected. His family noted that he exhibited impulsive behaviors such as picking at the skin in the area where the pulse generator was implanted. At the 15-month follow-up, his Y-BOCS, HAM-D, and GAF scores were 25, 28, and 65, respectively.

To avoid further infection, the right-side pulse generator was removed; thereafter, the local inflammation resolved. His habit of picking the skin in the area of pulse generator implantation gradually disappeared, and the stimulator device was re-implanted 4 months later. At the 24-month follow-up, infection



Figure 1. Image of the wound (white arrow).

had not re-occurred, and his Y-BOCS, HAM-D, and GAF scores were 32, 33, and, 61, respectively (Fig. 1).

3. Discussion

Previous studies have reported the occurrence of infection after DBS surgery in patents with OCD.^[2–6] (Table 1) Dell'Osso et al^[2] reported scar-picking behaviors in a patient with treatment-resistant OCD after DBS surgery, which resulted in infection and DBS device removal. Skin picking is categorized as an impulse-control disorder (ICD) not classified elsewhere or otherwise specified; skin picking does not meet the criteria for any specific ICDs or other mental disorders.^[7] It is characterized by the repetitive and compulsive picking of the skin, leading to tissue damage.^[8] It is also conceptualized as belonging to OC spectrum disorders.^[9] Skin-picking disorder may occur with other disorders including major depressive disorder (12.5%–48%), anxiety disorders (8%–23%), and substance use disorders (14%–36%). Physicians must evaluate skin-picking disorder by using broader physical and psychiatric examinations. Cognitive behavioral interventions and pharmacology are the main treatments.^[8]

Compared with small trials of DBS in patients with OCD, a large-scale review of DBS in patients with Parkinson disease reported that infection rates for DBS surgery vary widely, from less than 1% to more than 15%. Skin-picking behaviors typically

Table 1

Infection after DBS surgery for treatment-resistant OCD.

Research groups (reference no.)	Case number	Sample size	Treatment	DBS location	Voltage (V) or amplitude (mA)	Frequency (Hz)	Pulse width (μ s)
Dell'Osso et al, ^[2] 2013	1	1	Removal and re-implanted the stimulating device	The ventral anterior limb of the internal capsule and adjacent ventral striatum	3.0V	130	90
Greenberg et al, ^[4] 2010	1	26	Superficial wound infection, which was successfully treated with antibiotics	Ventral internal capsule/ventral striatum	4–9V	100–130	150–350
Denys et al, ^[3] 2010	1	16	Wound infection at incision	Nucleus accumbens	3.5–5V	130	90
Mallet et al, ^[6] 2008	2	16	Infection leading to removal of pulse generator	Subthalamic nucleus	2.0 \pm 0.8V	130	60
Greenberg et al, ^[5] 2006	1	10	Superficial surgical wound infection after implantation, successfully treated with antibiotics	Ventral internal capsule/ventral striatum	8–17mA	100–130	90–210

DBS=deep brain stimulation, OCD=obsessive–compulsive disorder.

present within 3 months of surgery and most often occur at the site of the implanted pulse generator.^[10] Postoperative hardware-related infection requiring further surgery occurs in 4.5% of cases.^[11] Furthermore, the risk of hardware-related infection in DBS surgery is greater at impulse generator replacement than at the primary procedure.^[12] A higher rate of inflammatory complications after DBS surgery has also been reported in patients with Tourette syndrome,^[13] which also belongs to OC spectrum disorders.^[9] Therefore, awareness of the predictive factors for postsurgical infection in a specific group of patients will become paramount as the implementation of DBS treatment becomes more extensive.

4. Conclusions

In summary, we described a patient with refractory OCD who developed infection and skin picking after 1 year of DBS. Patients with the OC spectrum may have higher rates of postsurgical infection and device removal due to skin picking. Because DBS is now being extended to treatment of more neuropsychiatric disorders such as OCD, refractory depression, and Tourette syndrome, further research is necessary to evaluate skin-picking behavior during presurgical and postsurgical follow-up to reduce infection and device removal rates.

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