

Single Case – General Neurology

Surgery for Obsessive-Compulsive Disorder and Transient Tremors as Newly Reported Side Effect: First Psychiatric Neurosurgery in Egypt

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Keywords

Egypt · Obsessive-compulsive disorder · Psychosurgery · Cingulotomy · Tremor

Abstract

Introduction: The use of surgery for treatment of psychiatric conditions is a well-established strategy, especially in severe and resistant obsessive-compulsive disorder. Attractive anatomical and functional targets for stereotactic surgery are reported in some studies. Surgery for treatment of psychiatric conditions in our nation and Arab world is obscured and hidden because of several social and cultural limitations, which should be overcome. We report here the first psychiatric neurosurgery in our nation and how we overcome such community limitation. This is the first report of postoperative tremor. **Case Presentation:** Young patient presented with severe and persistent obsessive-compulsive disorder resistant to all non-surgical modalities for several years. Stereotactic ablation surgery was done under local anaesthesia. Marked improvement in our obsessive-compulsive disorder patient after psychiatric neurosurgery with self-limited tremor was not reported before in the literature. The medications were the same before and immediately after surgery and this is not a drug-induced tremor. Postoperative YBOCS showed 90% of improvement. **Conclusion:** Surgery-induced tremor could be a self-limited side effect after surgery in obsessive-compulsive disorder. Safety and efficacy should be promoted in our nation and Arab world. Society and cultural limitations should be overcome by further research studies, intervention, and activism in the field of mental health systems in our nation and Arab countries to improve awareness.

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Published by S. Karger AG, Basel

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Introduction

The undesirable side effects following frontal lobectomy and leucotomy were the main cause to introduce cingulotomy to treat mental illness with a relatively higher safety profile. The technique itself was further refined and became less invasive using the stereotactic instrument. This was derived from the hypothesis of James Papez who thought that the cingulum was a major component in emotion [1].

The first reports of cingulotomy on psychiatry came from J. le. Beau in Paris, Hugh Cairns in Oxford, and Kenneth Livingston in Oregon [1]. Later studies confirmed the role of anterior cingulum in cognition and mental illness using fMRI, stereotactic electrode studies, and surgical procedures [2]. Cingulum became an attractive target for several indications such as cancer pain with significant results on pain scales following surgery [3, 4] and also for treatment-refractory major depressive disorders [5]. Obsessive-compulsive disorder (OCD) is one of those indications. It was found that bilateral rostral anterior cingulotomy could much decrease OCD symptoms [6]. Hereby, we report the first OCD case to be treated by cingulotomy in our country and Arab world after many social and cultural challenges and with a newly reported postoperative self-limited tremor, which was not drug induced.

Case Description

Our anonymized patient is an 18-year-old intelligent young man; a secondary school student; resident of an urban area; from a middle-class family. Four years ago, a very distressing and painful event befell the family; namely, the boy's father – who was at this time at the end of his thirties and a successful lawyer – developed total and complete quadriplegia due to haemorrhagic stroke. The young successful father became totally bed ridden, aphasic, and reported urine and stool incontinence, and he is still severely ill until the present time. Following this calamity, the boy (our patient) was deeply shocked and saddened. He participated for a considerable time in nursing his quadriplegic father.

Shortly after, our patient developed symptoms of severe OCD in the form of acute onset of intrusive ego-dystonic thoughts, mainly of a sexual nature. The thoughts were about him being sexually oriented towards the same sex and having a sexual desire towards his male peers especially muscular ones. The thoughts were accompanied by intrusive images also of a homosexual content as well as intrusive impulses.

Our patient also suffered from abnormal sensation (orgasm like) about his anus. These sensations were very distressing for him as they made the obsessions more real and fearful (pseudo-hallucinations of a tactile [haptic] modality vs. sensory component of OCD). The boy was panic stricken and horrified because of those thoughts upon which he looked as absolutely disgusting, horrifying, and shameful. He tried to fight and neutralize OCD with all his might.

He developed compulsions of two types [1]: behavioural acts: in the form of seeking reassurance from his close family members and asking them repetitive questions revolving around the same theme [2]. Mental compulsions and ruminations: as expected, his desperate mental fight and ruminations led to nothing but the deterioration of the clinical picture and the deepening of his suffering.

The course of the disease was progressive and of an aggressive nature. Depression and easy irritability appeared shortly after OCD. The patient attempted suicide more than one time. Marked deterioration in academic career and scholastic achievement was reported and also social withdrawal. He stopped going to the gym or playing football because the sight of

muscular men never failed to precipitate his sexual obsessive thoughts and images. He tried to avoid seeing men.

The youth's family brought him to medical attention approximately 1 year following onset of the disease. For more than 3 years, the patient received multiple adequate therapeutic trials of SSRIs (namely, fluvoxamine and sertraline among others); he also received clomipramine which he could not tolerate because of the heavy sedation it caused him. Even if the patient responded to those trials, the response was never maintained, and the patient turned to be treatment refractory within a few months at best. Treatment was augmented with the following:

1. Optimum doses of antipsychotics
2. At least 10 sessions of cognitive behavioural therapy; exposure and response prevention technique
3. At least 20 sessions of repetitive transcranial magnetic stimulation: target area of interest is the supplementary motor area

None of these non-invasive methods of treatment resulted in maintained improvement. The patient continued to suffer considerably, and his academic achievement never returned to what it had been prior to his illness. The decision was taken to give the patient the chance of stereotactic cingulotomy.

The procedure was performed with local anaesthesia and mild sedation. The stereotactic frame was applied, and computer tomography was obtained with thin slices (Toshiba Aquilion One 320 Slice CT Scanner). The preplanned magnetic resonance images were obtained using Toshiba Vantage Titan 1.5T MRI (Toshiba Medical Systems, Ohtawara, Japan) using T1-weighted image (TE = 10 ms, TR = 600 ms, slice thickness = 0.5 mm, spacing interval = 0.05 mm), then co-registered with the stereotactic computer tomography images using inomed planning software iPS. The trajectories were designed to ablate the anterior cingulum on both sides.

The Riechert Munding system was used as the only stereotactic system on the market with three fixation points and artefact free offering very high level of stability, precision, and accuracy with target-point stimulator. Our institute is the only one used it in our country to date. The radiofrequency generator was inomed Neuro N50 delivered by bipolar TC013 standard thermistor-equipped thermocoagulation electrode (inomed Medizintechnik GmbH, Emmendingen, Germany). Informed consent was obtained from the patient with Ethical Committee approval (36264-PR-347).

Immediate postoperative CT brain was obtained to rule out any surgical complication; then 2 days after operation, MR brain was obtained to document the lesioning target (Fig. 1). After surgery, our patient was early responder; anxiety, then depression markedly improved within the first weeks. Some stress related to body disfigurement thoughts due to surgery, which resolved with stitches removal and reassurance. OCD manifestations reduced dramatically (approximately 30%) within first week, then reduced by more than 50% on Y-BOCS within a month, then more than 90% in the third month postoperatively (Table 1). The patient reported significant satisfaction of the procedure with dramatic relief of anxiety, depression, and OCD thoughts. Postoperative minor symptoms such as nausea, headache, confusion, urine incontinence, and intention tremor were resolved within a few days. The hand tremor was newly reported an unexpected and managed with β -blockers. The tremors were not drug induced because medications were not changed immediately postoperatively and during tremor time. CARE guidelines were followed during the report.

Regarding hand tremors, they were fine, action, intentional, 3–6 cycles per second, involving both hands of the patient without affecting other parts of his body, appeared few hours postoperatively, and resolved within 1 week postoperatively on propranolol (Inderal

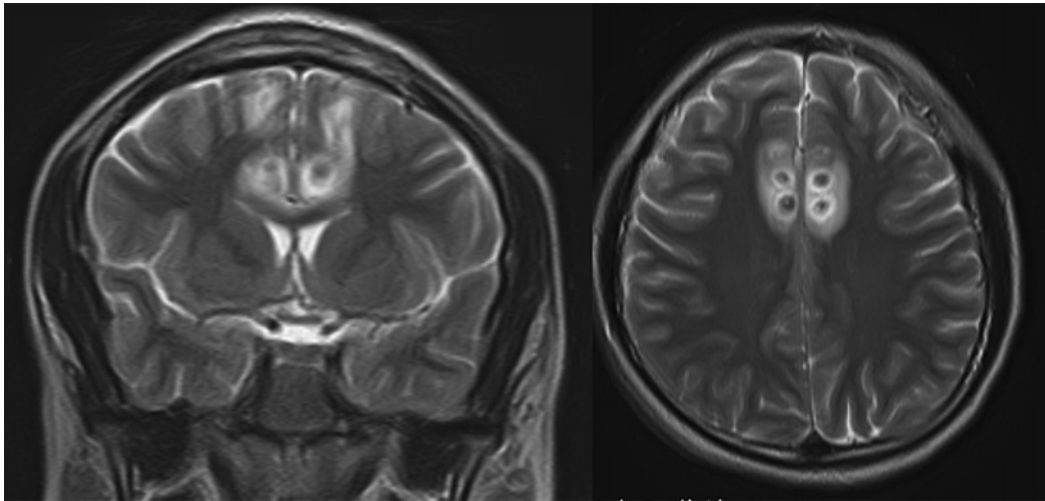


Fig. 1. MRI images show the cingulotomy lesions.

10 mg tablet twice per day). CARE checklist was followed during case description and discussion (see online suppl. material; for all online suppl. material, see <https://doi.org/10.1159/000538331>).

Discussion

To the best of our knowledge and literature database, this is the first psychiatric neurosurgery in our nation and Arab world. It is hard and difficult for the society to adapt to such procedure. We spent a lot of effort to convince the patient and the Ethical Committee with such decision. However, the technique is well established in many countries of Europe and the United States. There is global agreement among institutes that major affective disorder, chronic anxiety states, and OCD are the best candidates for psychosurgery [5].

We analysed our lesions to be correlated with functional mapping as it was reported before and we found a close relation to the optimum target [7]. We reported a new self-limited side effect in terms of tremor for the first time here. Previous studies reported mild headache, nausea, confusion, drowsiness, and urine and stool incontinence for few days, but they did not report tremors [1, 7–11] (Table 2). The relationship between the psychiatric neurosurgery here could be because of some common circuits between cingulum and motor function. Several studies demonstrated a link between cingulum and tremors [8, 9]. Somatosensory area also has been reported to be crucial part in motor regulation through several studies [10]. In our case, the cingulum ablation itself and the heat through the trajectory of the radiofrequency needle passing through somatosensory areas (Fig. 1) could explain the presence of tremors in our case for a transient time [11]. Strong circuit between thalamus (ventral intermediate nucleus) and somatosensory area regulates motor processing and voluntary action plan [12, 15–17]. The heat and oedema around the lesion in radiofrequency trajectory passing through somatosensory area could be interfering with central motor commands or by altering central somatosensory processing. Another involved circuit could include cingulate, supplementary motor area, lateral premotor cortex, diencephalon, secondary somatosensory cortex, posterior parietal cortex, and the contra-lateral cerebellum [13].

Table 1. Patient score before and after psychosurgery

Test name	Test item	Preop	1 month	6 months
Y-BOCS				
1	Time occupied by obsessive thoughts	4	3	1
2	Interference due to obsessive thoughts	4	3	0
3	Distress associated with obsessive thoughts	4	4	1
4	Resistance against obsessions	4	0	0
5	Degree of control over obsessive thoughts	4	0	0
6	Time spent to perform compulsive behaviours	3	0	0
7	Interference due to compulsive behaviours	4	0	0
8	Distress associated with compulsive behaviour	4	0	0
9	Resistance against compulsions	3	0	0
10	Degree of control over compulsive behaviour	4	0	0
	Total	38	10	2
	<i>p</i> value		<0.01	<0.001
BDI				
1	I feel sad	3	3	0
2	I feel discouraged about the future	3	3	0
3	I feel like a failure	3	3	0
4	Anhedonia	1	1	0
5	I feel guilty	3	3	0
6	I feel I am being punished	3	3	0
7	I am critical of myself	3	3	0
8	Self-blame	2	2	0
9	Suicidal thoughts	3	3	0
10	Frequent crying	1	1	0
11	Easy irritability	2	2	0
12	I have lost interest in other people	1	1	0
13	Making decisions	0	0	0
14	Worthlessness	3	3	0
15	I cannot work	1	1	0
16	Insomnia	0	0	0
17	I get tired from almost anything	2	2	0
18	Loss of appetite	1	1	0
19	I have lost weight	0	0	0
20	I am worried about my health	0	0	0
21	Interest in sex	1	1	0
	Total	36	36	0
CGI-S				
1	Normal, not at all ill			
2	Borderline mentally ill			√
3	Mildly ill			
4	Moderately ill		√	
5	Markedly ill			
6	Severely ill	√		
7	Among the most extremely ill			
CGI-I				
1	Very much improved			√
2	Much improved		√	
3	Minimally improved			
4	No change	√		
5	Minimally worse			
6	Much worse			
7	Very much worse			

Table 2. Review of literature of previously reported cingulotomy for OCD

Author	Country	Year	No	Surgery	Outcome	Transient adverse effect
Baer et al. [11]	USA	1995	18	Stereotactic	5 responders 3 partial responders	Urination problem Nocturnal visual hallucinations Gained body weight Loss of weight Decreased libido Insomnia Palatal dystonia Headaches
Dougherty et al. [1]	USA	2002	44	Stereotactic	14 responders 6 partial responders	Memory deficits Apathy Urinary disturbances Seizure Oedema
Kim et al. [8]	Korea	2003	14	Stereotactic	6 responders	Mild headache Insomnia Gained body weight
Jung et al. [9]	Korea	2006	17	Stereotactic	8 responders	Memory deficits
Zhang et al. [10]	China	2013	7	Stereotactic	5 responders	Not reported
Starkweather et al. [7]	USA	2022	18	Stereotactic	9 responders 1 partial responders	Not reported

For decades, psychiatric neurosurgery was a very hidden field in our nation and Arab world because of many social and cultural issues. Mental health patients in our nation tend to express their psychological issues in terms of physical manifestations avoiding the stigma attached to mental illness. They also tend to underutilize psychological services and to hold negative attitudes towards their illness. They rely upon a deity and religious leaders as means of coping with mental health issues. It is understood that higher rates of mental health problems are found in politically volatile and violent regions. Cultural beliefs of possessions and the impact of sorcery or the evil eye affect interpretation of mental symptoms [14, 18]. Our patient reported that he started “*a new life*” without fear of disease progression and handicapped daily activities.

We deeply are motivated to publish this case to spread more awareness about this surgery in our nation, culture, and community through our publication. The introduction of psychiatric neurosurgery in our nation will much improve patients’ quality of life and decrease their suffering as well as decrease their need for hospitalization, which will decrease the burden on the national economy.

Conclusion

Cingulotomy-induced tremor could be a self-limited side effect after surgery in OCD. Safety and efficacy of surgery of psychiatric conditions should be promoted in our nation and Arab world. Society and cultural limitations should be overcome by further research studies, intervention, and activism in the field of mental health systems in our nation and Arab countries to improve awareness.

Statement of Ethics

This study protocol was reviewed and approved by Faculty of Medicine – Ethical Committee, approval number (36264-PR-347) with permission to publish with anonymized data of the patient. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare regarding financial involvement (e.g., employment, consultancies, honoraria, stock ownership and options, expert testimony, grants, or patents received or pending, royalties) and nonfinancial relationships (personal, political, or professional).

Funding Sources

Authors declare that there was no funding of any research relevant to their study and no sponsor.

Author Contributions

Hussein Hamdi: the corresponding author, the surgeon, and manuscript writing, revision, concept, and supervision. Hend Aref: the psychiatrist, patient selection, manuscript writing and revision, and follow-up.

Data Availability Statement

All data generated or analysed during this study are included in this article. Further enquiries can be directed to the author.

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