



## Case Report

# Electroconvulsive therapy for bipolar depressive and mixed episode with high suicide risk after epilepsy surgery

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## ARTICLE INFO

## Article history:

Received 25 May 2008

Accepted 1 July 2008

Available online 8 August 2008

## Keywords:

Epilepsy

Epilepsy surgery

Suicide

Electroconvulsive therapy

Bipolar disorder

## ABSTRACT

Mood disturbance is a common comorbid condition of temporal lobe epilepsy before and after surgery. Suicide is more frequent in patients with epilepsy than in the general population. As suicide is a major issue in both epileptic and depressive patients, it is critical to treat aggressively any psychiatric illness with suicidal ideation. We describe two patients who, after temporal lobe surgery, developed a serious bipolar disorder that necessitated electroconvulsive therapy (ECT), despite better seizure control. Unfortunately they were not able to commit to a regular treatment plan with their psychiatrists to prevent a suicide. These patients underwent a course of ECT treatments. After the ECT regimen, acute suicidal intent remitted and was replaced by chronic suicidal ideation without active intent or plan. The patients were then able to commit to a treatment plan regarding their medications and control visits. These cases represent the safe utilization of ECT as a rapid and effective treatment option for bipolar disorder with suicide ideation following epilepsy surgery. Patients and parents should be advised about possible psychiatric disturbances and suicide risk after epilepsy surgery, especially in the presence of a temporal lobe epilepsy, even when seizure control is achieved postoperatively.

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## 1. Introduction

For patients with chronic partial seizures who do not respond to antiepileptic drugs (AEDs), surgical removal of the epileptogenic tissue offers an alternative method for controlling seizure activity. However, despite good results regarding seizure control, psychiatric complications can be very disturbing. Patients who are psychiatrically intact before surgery may be at significant risk of postoperative de novo psychiatric disorders [1]. The risk may even be higher, especially for patients with epilepsy and comorbid psychiatric disorders prior to surgery [2].

Suicide, which is derived from the Latin word for “self-murder,” is a fatal act that represents the patient’s wish to die. Physical illness or impairment and psychiatric illness are among the variables enhancing suicide risk. Mood disorders, which are prevalent in patients with epilepsy, are commonly associated with suicide. It is estimated that the lifetime risk for death by suicide is approximately 15 to 20% for individuals with bipolar disorder and 10% for patients with other mood disorders [3]. The risk of completed suicide in patients with epilepsy is four to five times greater than among the nonepileptic population; those with complex partial seizures of temporal lobe origin have a significantly higher risk,

as much as 25 times greater [4]. The suicide rate in patients who have undergone temporal lobectomy has been reported to be as high as 5% [5]. The suicide risk is especially high in the absence of a strong social support system and in patients with a history of impulsive behavior and a suicidal plan of action. Immediate emergency hospitalization and an aggressive treatment plan are required for patients considered seriously suicidal.

Electroconvulsive therapy (ECT) is a rapid and effective treatment option for severely depressed patients who might be acutely suicidal or homicidal or have marked symptoms of agitation or stupor. There is no absolute contraindication to ECT according to the American Psychiatric Association recommendations [6]. ECT may be also used in patients with seizure disorders. Case reports have documented the safe use of ECT in depressed patients with epilepsy, after epilepsy surgery [7,8].

We describe two patients who, after surgery, developed marked bipolar disorder with severe suicidal ideation that necessitated ECT.

## 2. Case reports

### 2.1. Patient 1

A 25-year-old woman, married with one child, was admitted to the neurology department with uncontrolled complex partial seizures that had started at the age of 8. The patient had been on

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several antiepileptic drugs in different combinations without success. MRI revealed left mesial temporal sclerosis. Video/EEG monitoring revealed ictal activity originating from the left mesial temporal area. Selective left amygdalohippocampotomy (AHE) was performed and provided good seizure control except for rare auras.

The patient had difficulty in coping with her epilepsy and had reported depressive symptoms from time to time before the surgery. However, because her symptoms were minor and transient, no treatment was recommended during preoperative evaluations.

Four months after surgery, the patient was referred to the psychiatric outpatient unit because of depressive symptoms characterized by decreased appetite, decreased energy, irregular sleep, anxiety, decreased interest, but, at the time, no suicidal ideation. She was on oxcarbazepine 1200 mg/day. Escitalopram 10 mg/day was administered for depression, but as logorrhea, flight of ideas, irritability, and severe dysphoria started immediately afterwards, she was diagnosed as having a treatment-induced manic episode and escitalopram was immediately discontinued. Risperidone 4 mg/day and valproate 1000 mg/day were added to her current regimen. Symptoms were controlled within a week, and full recovery occurred within a month. Risperidone was gradually decreased to 1 mg/day in 2 months. Within 4 months the patient developed a severe major depression with prominent psychomotor retardation and serious suicidal ideation. Venlafaxine 150 mg/day was started, but the suicidal ideation and agitation remained severe. She was mostly alone at home when her husband went to work and had no relative to support her. During this period she was actively making plans to kill herself, and was not able to commit to a regular treatment plan with her psychiatrist to prevent a suicide. Therefore, she was immediately hospitalized, and because inpatient unit conditions were not suitable for very close long-duration observation, an ECT regimen was planned. The pre-ECT evaluation included normal standard chemistries and ECG. The pre-ECT EEG revealed delta slowing in the left temporal area. ECT indication, and ECT competency consultations were performed. Potential increased confusion, increased memory loss, status epilepticus, and recurrence of seizures secondary to kindling were discussed with her neurologist.

The patient underwent a course of five ECT treatments. Power settings were pulse with duration of 2.0 seconds and current of 0.8 A. All treatments were bilateral. Total seizure duration was 165 seconds. Premedications were 30 mg succinylcholine and 70 mg propofol.

After completion of the ECT regimen, acute suicidal intent remitted and was replaced by chronic suicidal ideation without active intent or plan. The patient was then able to commit to a treatment plan regarding her medications and control visits. During ECT treatment, venlafaxine was gradually increased to 225 mg/day, risperidone was decreased to 0.5 mg/day, and mirtazapine 30 mg/day was started. However, depressive symptoms of reduced severity persisted. Three months later, lamotrigine 25 mg/day was started and gradually increased to 200 mg/day. After augmentation with lamotrigine, depressive symptoms were significantly reduced. At her 1-year follow-up she was still in remission with venlafaxine 225 mg/day, risperidone 1 mg/day, and lamotrigine 200 mg/day, and had been seizure and aura free for the last year.

## 2.2. Patient 2

A 20-year-old single man was admitted to the neurology department with uncontrolled complex partial seizures that had started at the age of 3; the patient had had a difficult birth. He was experiencing two or three seizures per week. The patient was not responsive to various AEDs. MRI was normal. He underwent intracranial video/EEG recording with subdural electrodes

and a temporal lobectomy. Pathological investigation demonstrated cortical dysplasia type 1A. However, as his seizure control was not satisfactory after surgery, phenobarbital 300 mg/day, carbamazepine 1000 mg/day, and levetiracetam 2000 mg/day continued to be administered. Before surgery, the patient had reported depressive symptoms, which were not treated.

Four months after surgery, he became depressed. His parents reported lack of interest, irritability, decreased appetite with marked weight loss, decreased energy, early-morning awakenings, and mild agitation. Citalopram 20 mg/day was started. After 2 months, his symptoms remitted. Two and a half months following remission, the patient was brought to the neurologist by his family because of inappropriate behavior. Psychiatric consultation revealed elevation of mood, increased activity, logorrhea, and flight of ideas. He was diagnosed as having a manic episode due to a general medical condition, citalopram was immediately discontinued, and risperidone 2 mg/day was started. The manic symptoms were controlled within 2 weeks. Subsequently, risperidone was stopped, and the patient continued to take only AEDs. Thirteen months after surgery, the patient was referred to the psychiatry clinic again because of dysphoria, agitation, flight of ideas, verbal perseveration, increased activity, and suicidal ideation and plans. He would leave home in an agitated state telling his parents that he was going to kill himself and they were unable to control him. Therefore, the patient was immediately hospitalized with a diagnosis of mixed episode due to a general medical condition. Ziprasidone (160 mg/day) and valproate (up to 1500 mg/day) were added to his regimen; however, ziprasidone was soon discontinued because of severe anxiety and insomnia. Amisulpride 800 mg/day was started. As inpatient unit conditions were not amenable to continuous long-duration observation, an ECT regimen was scheduled because of noticeable agitation and severe suicidal ideation.

Pre-ECT evaluations included normal standard chemistries and ECG. The pre-ECT EEG revealed slowing in the left temporal area. ECT indication, and ECT competency consultations were performed. Potential increased confusion, increased memory loss, status epilepticus, and recurrence of seizures secondary to kindling were discussed with his neurologist.

The patient underwent a course of six ECT treatments. Power settings were pulse with a duration of 2.5 seconds and current of 0.8 A. All treatments were bilateral. Total seizure duration was 145 seconds. Premedications were 50 mg succinylcholine and 100 mg propofol.

After completion of the ECT regimen, acute suicidal intent and agitation remitted. Mood symptoms did not completely remit, but decreased in severity. He was discharged on amisulpride 800 mg/day, along with phenobarbital 300 mg/day, carbamazepine 1000 mg/day, and levetiracetam 2000 mg/day. During follow-up, amisulpride was discontinued because of severe akathisia; his symptoms remitted after the addition of aripiprazole. He continues to have one or two short complex partial seizures a month.

## 3. Discussion

We have described two patients who, after temporal lobe surgery, developed a serious bipolar disorder that necessitated post-surgical ECT. Although complete remission of bipolar disorder could not be achieved, severe suicidal ideation and plans were decreased. Total remission of symptoms was achieved with lamotrigine augmentation in one patient and aripiprazole in the other patient.

Our first patient had reported depressive episodes that were not treated prior to surgery and had her first severe major depressive episode 4 months after surgery, which was followed by a manic

episode during antidepressant therapy. The second major depressive episode occurred 11 months after surgery with severe suicidal ideation that necessitated ECT.

The second patient, who had also reported depressive symptoms before surgery that were not treated, had his first major depressive episode 4 months postsurgery, which was followed by a manic episode during antidepressant therapy. Thirteen months after surgery, he was diagnosed with a mixed episode comprising severe dysphoria, agitation, and severe suicidal ideation, which necessitated ECT.

Postoperative depression is characterized by depressed feelings, hopelessness, loss of interest, and severe sleep disorders. It often evolves out of emotional irritations during the first months after surgery. Naylor et al. reported 8% new cases of depression in patients who had undergone resection of hippocampal sclerosis [9]. Ring et al., in 1998, reported 17% new cases of depression after a 3-month postoperative assessment [10].

Postoperative mania is reported to occur less frequently than depression. It has been limited to case reports and a small study conducted by Carran et al. [11], who diagnosed postoperative mania in 16 of 415 patients (3.9%) in a period of 14 years. According to this study, the patients with mania more frequently exhibited preoperative bilateral temporal abnormalities and greater involvement of the right temporal lobe.

Contrary to the findings of that study, both of our patients had left temporal lobe involvement. However, both of our patients did experience a manic switch after antidepressant use, and this fact may explain the difference. It has been documented that a significant proportion of patients with unipolar depression clinically develop a manic or hypomanic switch during acute antidepressant treatment [12]. Therefore, we think that it remains a challenge to identify patients who are at risk for developing a bipolar disorder and depression and that these patients should be treated with different measures. In addition to psychotherapy, a mood stabilizer, especially lamotrigine, which has been reported to be particularly effective in bipolar depression, might be the first choice of treatment in these patients [13].

Predicting postoperative psychiatric disorders is a challenge. The greatest predictive factor for postoperative depression is preoperative depression. Preoperative symptoms of depressed mood may worsen during the postoperative phase: Quigg et al. found that high presurgical depression-related morbidity leads to a high probability of depression within the first year after surgery [14]. Both of our patients reported depressive symptoms before surgery, but these symptoms were transient and were not considered severe enough to treat. Postoperative psychiatric disorders often resolve spontaneously or with psychotropic medication. Therefore, the prophylactic use of psychotropics for postoperative psychiatric complications in a high-risk population is unclear.

Seizure control is another very important factor significantly associated with lower rates of postoperative depression [15]. It has also been reported that postoperative mania may result from continued epileptiform activity after resection [16]. In our second case, epileptiform activity continued after the operation.

There are several case reports documenting the safe use of ECT in depressed patients after epilepsy surgery [7,8]. Post-temporal lobectomy suicide rates as high as 5% have been reported in the literature [5]. The strongest indication for ECT is a high risk of suicide. Although ECT changed the suicidal ideation in both patients, unfortunately full remission could not be achieved.

ECT can be a safe treatment for patients with epilepsy, because during a cycle of ECT treatment the seizure threshold considerably increases [17]. The literature suggests that ECT can be used safely in patients with depression and epilepsy. There are two studies reporting an increased risk of unprovoked seizures following ECT [18,19]. Devinsky and Duchowny reviewed all documented cases

of spontaneous seizures that followed convulsive therapy and found that the average annual incidence of spontaneous seizures was 114 per 100,000, five times more frequent than in an age-adjusted nonpsychiatric group [18]. However, the risk is low enough to safely treat patients with epilepsy with convulsive therapy.

Both convulsive and nonconvulsive status epilepticus have been reported after ECT [20,21]. In contrast, ECT has also been used to terminate status epilepticus, possibly by recruiting inhibitory action from healthy tissue [22,23]. ECT seems to be effective in treating patients with serious suicide risk, mania, and treatment-refractory depression. As with all of the many other central nervous system diseases, epilepsy is highly associated with mood disorders, and patients with epilepsy may have at their disposal a variety of medications with which to kill themselves. If a patient with epilepsy is considered seriously suicidal, has a history of impulsive behavior, has a suicidal plan of action, and lacks a strong social support system, immediate emergency hospitalization may be required and ECT might be necessary.

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