Brain Stimulation 12 (2019) 1089–1090

Contents lists available at ScienceDirect

Brain Stimulation

journal homepage: http://www.journals.elsevier.com/brain-stimulation

A case of mania, visual hallucinations, and suicidal ideation in the setting of recent implantation of responsive neurostimulator system electrodes

To the editor:

The association between epilepsy and bipolar disorder is well-established and detailed in numerous studies [1,2]. One study suggests that one in six patients with epilepsy will also experience symptoms of bipolar illness [3]. In some cases it may be difficult to differentiate between true mania and ictal states, with the latter perhaps more appropriately characterized as interictal dysphoric disorder. While further research should elucidate the overlap between ictal states and mania, it is clear that mania and epilepsy have a close connection.

Numerous case studies demonstrate the emergence of mania or hypomania in the aftermath of epilepsy treatment. For instance, Klein et al. (2003) discusses the case of an individual who developed hypomania after treatment with a vagus nerve stimulator for refractory epilepsy [4]. This case underscores the connection between epilepsy, mania, and neurosurgical procedures. Salloum et al. (2017) and Gerson et al. (2011) both write about patients who developed mania after receiving vagus nerve stimulation [5,6]. Other neurosurgical procedures, such as a temporal lobectomy, have also been shown to be associated with the emergence of mania. One study discovered up to 16 cases of mania following temporal lobectomy [7].

When it comes to neurosurgical procedures, Responsive Neurostimulation (RNS) technology is a relatively new technique that has been shown to be safe and effective in the treatment of refractory epilepsy [8]. Yet there is a dearth of information about possible mood-related adverse effects. In this report, we discuss a case of mania, visual hallucinations, and suicidal ideation following a recent implantation of a responsive neurostimulator.

A 49 year-old female with a history of bipolar I, post-traumatic stress disorder, prior suicide attempt, asthma, and epilepsy, was admitted to the hospital for worsening mania, visual hallucinations, and suicidal ideation in the setting of recent implantation of responsive neurostimulator system electrodes. In January, the patient had surgery for EEG electrode placement for management of medically refractory epilepsy that she had since childhood. In February, the patient had a responsive neurostimulator implanted, with depth electrodes to the right insula (via a right frontal burr hole) and right hippocampus (via right occipital burr hole). The neurostimulator was not turned on initially; it remained in detection mode only. In March, the patient called the Neurology clinic with concerns that she was developing manic symptoms. Neurology felt these symptoms were unlikely to be related to the RNS, especially as it was still only in detection mode. Bipolar disorder and post-ictal psychosis were both considered, and the patient was advised to increase her carbamazepine dose at home.

The manic symptoms continued, and the patient was admitted to the Neurology service in mid-March. On admission, the patient reported a decrease in seizures since her previous admission. The RNS suggested possible nightly seizure activity, raising some suspicion for post-ictal psychosis, though subsequent video EEG monitoring did not reveal any epileptic activity. On admission she acknowledged several weeks of “manic” symptoms, described as hypersexuality and promiscuity, racing thoughts, increased energy, distractibility, decreased need for sleep (though still sleeping 6 h per night), and resumption of marijuana use. She reported that she also began experiencing visual hallucinations of spiders three days prior to admission. She was seen by the CL Psychiatry service, during which she continued to endorse the above symptoms, in addition to ongoing suicidal ideation.

After several days of observation on the Neurology service, with no further seizure activity captured, the patient was transferred to the inpatient Psychiatry service. Home anti-epileptic drugs and psychotropics – carbamazepine, zonisamide, quetiapine, and duloxetine – were continued on admission, and found to be at therapeutic levels, except for zonisamide which was mildly subtherapeutic at 7.7 mcg/mL. Quetiapine was titrated up to 300 mg nightly and valproic acid was added at 500 mg BID. Over the course of an eight-day admission, the patient reported marked improvement in manic symptoms, resolution of visual hallucinations, and remission of suicidal ideation. She was discharged with close outpatient neurology follow-up.

It cannot be said with certainty that the neurosurgical procedures above directly caused the emergence of mania, but it is important to consider the possibility. Whether the procedure itself – and the involved brain regions (in this case, the insula and hippocampus) -– triggered manic symptoms, or the stress of preparing for, undergoing, and recovering from an invasive procedure contributed to mood destabilization, such a scenario, in general, presents an opportunity to think more broadly about comorbid psychiatric illness when preparing for neurosurgical procedures. One might consider post-ictal psychosis, post-surgical mania, and even the possibility of underlying personality disorders. While numerous case studies have discussed the notion of forced normalization – the emergence of psychoses after control of seizures – relatively few, if any, discuss the emergence of bipolar mania after seizure control. Additionally, a history of psychogenic non-epileptic

https://doi.org/10.1016/j.brs.2019.04.006

seizures might be noteworthy, and would argue for the role of stress in the emergence of psychiatric illness. There is certainly a well-documented link between epilepsy and affective disorders, as well as between surgical treatments of epilepsy and onset of psychiatric illness. However, with newer technology, such as the RNS, less is known about potential adverse outcomes. In these cases, a multidisciplinary team that includes a psychiatric consultant might allow further consideration of prophylactic treatment, as well as closer post-surgical monitoring to catch signs of emerging illness.

Declarations of interest

None.

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Thomas Kuczmarski, Jonathan Greenberg, Barbara Wilson*
Dartmouth-Hitchcock Medical Center, Lebanon, NH, United States

* Corresponding author.
E-mail address: Barbara.A.Wilson@hitchcock.org (B. Wilson).

22 March 2019
Available online 27 April 2019