

Neurosurgeon studying if deep brain stimulation can help with bipolar disorder

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Jennifer Sweet, MD, a neurosurgeon at University Hospitals Case Medical Center, recently opened a clinical research study to learn if there is a structural target in the brain for patients suffering from bipolar disorder and whether deep brain stimulation (DBS) can bring them relief.

Participants are being recruited through the UH Mood Disorders Program, which treats about 1,000 patients annually with [bipolar disorder](#).

Bipolar disorder is associated with episodes of mood swings ranging from depressive lows to manic highs. Each of these cycles can last for weeks or months. It is among the leading causes of disability in young adults worldwide, according to Dr. Sweet, who is also an Assistant Professor of Neurosurgery at Case Western Reserve University School of Medicine.

While many patients respond to medications, most do not have complete control of cycling, and others have little or no response. It is hoped that DBS can help such non-responsive patients, or perhaps down the line even patients whose response to drugs become less effective over time.

Dr. Sweet's study has two parts that will continue for at least three years. In the first part, currently underway and continuing through this year, she actively is enrolling 10 bipolar type I patients who do not respond to medications, 10 bipolar type I patients who do respond to treatment, and

10 healthy volunteers.

Participants will get a specialized type of MRI with diffusion-weighted imaging sequences, which can see how water molecules spread through the brain to create three dimensional maps of neurons in their brains. Dr. Sweet and her team will look for "connectivity" differences in structures among the different groups of participants.

"There are no obvious structural abnormalities in bipolar patients that can be seen with conventional MRI, but perhaps we can show that while Point A is still connected to Point B in bipolar patients, this connection or wiring is not functioning properly. Maybe the 'cables' aren't as strong as in healthy controls," said Dr. Sweet.

The biologic cables she refers to compose a fiber tract in the brain call the cingulum bundle that connects different parts of the gray matter in the frontal area of the brain.

According to the National Institute of Mental Health Web site, one MRI study found that the brain's frontal area in adults with bipolar disorder tends to be smaller and function less well compared to adults without bipolar disorder. This area of the brain is involved in "executive" functions such as solving problems and making decisions.

Pinpointing differences in the structure of the cables may give neurosurgeons a new target for treating the disorder through DBS.

Once the first part of the study is complete, Dr. Sweet's group will then recruit six of the bipolar participants who are unresponsive to medications and in whom structural imaging showed abnormal connectivity, to undergo a randomized, double-blinded pilot study to evaluate the safety and efficacy of DBS.

The participants will undergo DBS surgery, researchers and participants will both be blinded to the state of the stimulator. Prior to, during, and after the study, patients will be provided routine clinical and research care by the UH Mood Disorders Program.

"Bipolar disorder is so debilitating for many of the people who have it, and it strikes at a younger age, so it is a disease with which patients must contend throughout their lives. If DBS works, it will offer hope for patients, especially those who get no relief from medications," said Dr. Sweet.

The study is currently funded by the National Institutes of Health to the Case Western Reserve University School of Medicine.

Deep brain stimulation (DBS) has been approved by the FDA for treating the symptoms of Parkinson's disease and essential tremor, and it is FDA approved under the Humanitarian Device Exemption for the treatment of dystonia and obsessive-compulsive disorder. Researchers also are exploring whether DBS can help improve life for patients with other disorders, such as unipolar depression, bipolar depression, and memory loss, among other diseases.

Provided by University Hospitals Case Medical Center

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