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'Brain pacemaker' effective for years against Parkinson's disease

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A "brain pacemaker" called deep brain stimulation (DBS) remains an effective treatment for Parkinson's disease for at least three years, according to a study in the June 2012 online issue of *Neurology*, the medical journal of the American Academy of Neurology.

But while improvements in motor function remained stable, there were gradual declines in health-related quality of life and cognitive abilities.

First author of the study is Frances M. Weaver, PhD, who has joint appointments at Edward Hines Jr. VA Hospital and Loyola University Chicago Stritch School of Medicine.

Weaver was one of the lead investigators of a 2010 paper in the New England Journal of Medicine that found that motor functions remained stable for two years in DBS patients. The new additional analysis extended the follow-up period to 36 months.

DBS is a treatment for Parkinson's patients who no longer benefit from medication, or who experience unacceptable side effects. DBS is not a cure, and it does not stop the disease from progressing. But in the right patients, DBS can significantly improve symptoms, especially tremors. DBS also can relieve muscle rigidity that causes decreased range of motion.

In the DBS procedure, a neurosurgeon drills a dime-size hole in the skull and inserts an electrode about 4 inches into the brain. A connecting wire

from the electrode runs under the skin to a battery implanted near the collarbone. The electrode delivers mild electrical signals that effectively reorganize the brain's electrical impulses. The procedure can be done on one or both sides of the brain.

Researchers evaluated 89 patients who were stimulated in a part of the brain called the globus pallidus interna and 70 patients who were stimulated in a different part of the brain called the subthalamic nucleus. (Patients received DBS surgery at seven VA and six affiliated university medical centers.) Patients were assessed at baseline (before DBS surgery) and at 3, 6, 12, 18, 24 and 36 months. Patients were rated on a Parkinson's disease scale that includes motor functions such as speech, facial expression, tremors, rigidity, finger taps, hand movements, posture, gait, bradykinesia (slow movement) etc. The lower the rating, the better the function.

Improvements in motor function were similar in both groups of patients, and stable over time. Among patients stimulated in the globus pallidus interna, the score improved from 41.1 at baseline to 27.1 at 36 months. Among patients stimulated in the subthalamic nucleus, the score improved from 42.5 at baseline to 29.7 at 36 months.

By contrast, some early gains in quality of life and the abilities to do the activities of daily living were gradually lost, and there was a decline in neurocognitive function. This likely reflects the progression of the disease, and the emergence of symptoms that are resistant to DBS and medications.

Researchers concluded that both the globus pallidus interna and the subthalamic nucleus areas of the brain "are viable DBS targets for treatment of motor symptoms, but highlight the importance of nonmotor symptoms as determinants of quality of life in people with Parkinson's disease."

Provided by Loyola University Health System