Neurostimulator

Deep brain stimulation (DBS) is a neurosurgical procedure introduced in 1987, involving the implantation of a medical device called a neurostimulator (sometimes referred to as a 'brain pacemaker'), which sends electrical impulses, through implanted electrodes, to specific parts of the brain (brain nucleus) for the treatment of movement and affective disorders.

see Neurostimulation.

Rechargeable neurostimulators for deep brain stimulation have been available since 2008, promising longer battery life and fewer replacement surgeries compared to non-rechargeable systems. Long-term data on how recharging affects movement disorder patients are sparse.

In the first multicenter, patient-focused, industry-independent study on rechargeable neurostimulators, four neurosurgical centers sent a questionnaire to all adult movement disorder patients with a rechargeable neurostimulator implanted at the time of the trial. The primary endpoint was the convenience of the recharging process rated on an ordinal scale from “very hard” (1) to “very easy” (5). Secondary endpoints were charge burden (time spent per week on recharging), user confidence, and complication rates. Endpoints were compared for several subgroups.

Datasets of 195 movement disorder patients (66.1% of sent questionnaires) with Parkinson's disease (PD), tremor, or dystonia were returned and included in the analysis. Patients had a mean age of 61.3 years and the device was implanted for a mean of 40.3 months. The overall convenience of recharging was rated as “easy” (4). The mean charge burden was 122 min/wk and showed a positive correlation with duration of therapy; 93.8% of users felt confident recharging the device. The rate of surgical revisions was 4.1%, and the infection rate was 2.1%. Failed recharges occurred in 8.7% of patients, and 3.6% of patients experienced an interruption of therapy because of a failed recharge. Convenience ratings by PD patients were significantly worse than ratings by dystonia patients. Caregivers recharged the device for the patient in 12.3% of cases. Patients who switched from a non-rechargeable to a rechargeable neurostimulator found recharging to be significantly less convenient at a higher charge burden than did patients whose primary implant was rechargeable. Age did not have a significant impact on any endpoint.

Overall, patients with movement disorders rated recharging as easy, with low complication rates and acceptable charge burden [1].

Activa® PC neurostimulator

Activa PC neurostimulator

PERCEPT™ PC NEUROSTIMULATOR

https://europe.medtronic.com/xd-en/healthcare-professionals/products/neurological/deep-brain-stimulation-systems/percept-pc.html

1)

Jakobs M, Helmers AK, Synowitz M, Slotty PJ, Anthofer JM, Schlaier JR, Kloss M, Unterberg AW, Kiening KL. A multicenter, open-label, controlled trial on acceptance, convenience, and complications of rechargeable internal pulse generators for deep brain stimulation: the Multi Recharge Trial. J Neurosurg. 2019 Aug 16:1-9. doi: 10.3171/2019.5.JNS19360. [Epub ahead of print] PubMed PMID: 31419794.