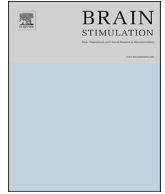




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Deep brain stimulation telemedicine for psychiatric patients during the COVID-19 pandemic



Keywords:

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Dear Editor,

We read with great interest the recent paper by Caulfield and George [1], in which they discuss how at-home neurotherapeutics, including self-administered repetitive transcranial magnetic stimulation and transcranial direct current stimulation, could assist to manage some of the potential mental health problems, particularly depression, caused by self-isolation during the COVID-19 pandemic. We concur with their view, but the authors did not discuss another neurotherapeutic technique that could be translated into a home setting, namely deep brain stimulation (DBS). Here, we briefly describe our experiences with the application of DBS telemedicine to maintain the delivery of DBS treatment and care to psychiatric patients who needed to remain at home during the COVID-19 outbreak and lockdown of the city of Wuhan (from 23rd January to 8th April 2020).

DBS is an implantable neurosurgical treatment that has been approved for the management of intractable obsessive-compulsive disorder (OCD) in many countries since 2009 [2]. Over the past three decades, the clinical utility of DBS has also been explored for other treatment-resistant psychiatric disorders, including major depressive disorder (MDD) [3], Tourette's syndrome [4], anorexia nervosa [5], and substance use disorders [6]. Usually, carefully selected patients receive DBS surgery at a specialized center and are advised to attend regular face-to-face clinical follow-ups and personalized DBS parameter (e.g., stimulation frequency, pulse width or voltage) adjustments at a DBS outpatient clinic to achieve the optimal DBS therapeutic effects. In China, new DBS systems incorporating information communication technology have been developed and utilized to deliver DBS treatment and care to patients with movement disorders at home [7]. The use of DBS telemedicine enables clinicians not only to remotely make therapeutic DBS parameter adjustments and battery checks, but also to offer medical consults and psychological support while patients are within their own home setting, regardless of whether they live in urban or rural areas.

The advantages of DBS telemedicine became particularly evident during the COVID-19 outbreak and lockdown of many areas. The implementation of relatively enduring preventive measures, such as travel restrictions, quarantines, and instructions to stay at home and self-isolate, made the outpatients' regular visits to the clinic not possible. This interruption of routine care could compromise their mental and physical well-being. Moreover, the patients were likely to be especially vulnerable to the detrimental psychological effects of social isolation, uncertainty, and stress associated with the COVID-19 pandemic [1,8]. This posed an additional significant mental health threat to our patients. To address these health risks, we utilized DBS telemedicine to deliver and manage the treatment and care at their own home.

Initially, we contacted all psychiatric outpatients treated with DBS to check their mental and physical health status. We also assessed their clinical symptoms as regularly scheduled using DBS tele-processing, synchronous real-time video communications, and online self-report clinical assessment scales. One patient with MDD had ran out of medications (daily dose, duloxetine 60 mg, olanzapine 5 mg, clonazepam 2 mg) and requested telemedicine DBS parameter adjustment to cope with recurrent depression symptoms. Not completely unexpected, DBS failed to work as a substitute for pharmacotherapy. The depression symptoms were eventually relieved by online prescribing of the patient's needed medications.

Another patient who had received DBS surgery for OCD was unable to visit the hospital for the initial post-operative DBS parameter adjustment. Consequently, DBS telemedicine was employed for the initial post-operative clinical examination and DBS parameter adjustment. Thereafter, the patient received additional DBS tele-processing parameter refinements and psychological support for the duration of one month (once a week) at home. After one month, the patient reported significant, stable improvements in OCD symptoms and satisfaction with the treatment.

These cases illustrate that DBS telemedicine can be particularly helpful during the COVID-19 pandemic to maintain the quality of health care delivery to psychiatric outpatients who need to stay at home and self-isolate. However, in contrast to the noninvasive at-home neurotherapeutics discussed by Caulfield and George [1], DBS telemedicine in an invasive therapeutic intervention that should only be applied to severe, chronic, and medically otherwise intractable cases of MDD or other psychiatric disorders. Yet, a relative advantage of DSB telemedicine is its capability to target specific deep brain structures, networks, and functions, including limbic and basal ganglia structures, that are believed to play a key role in the pathophysiology and disturbances of mood and motivation that underlie MDD and certain other psychiatric disorders.

Notwithstanding, we fully agree with Caulfield and George that the COVID-19 pandemic is underlining a growing need for the further development of at-home neurotherapeutics. We think that DBS telemedicine will have a significant role to play in the management of psychiatric patients who have been treated with DBS in general and, specifically, of those treated patients who need to stay at home and self-isolate during the COVID-19 pandemic.

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