

Concomitant Deep Brain Stimulation and Vagus Nerve Stimulation for Treatment-Resistant depression: a case report

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BACKGROUND

Major Depressive Disorder (MDD) is one of the leading causes of disability in adults. It is estimated that at least 50% of MDD patients do not achieve and sustain remission following multiple antidepressant treatments and may be diagnosed with Treatment-resistant depression (TRD). (1) (2) This report presents a case in which Deep Brain Stimulation (DBS) and Vagus Nerve Stimulation (VNS) were co-administered in a patient with TRD.

CASE REPORT

The patient is a 58 year-old male with major depressive disorder onset at age 13. During his life, the patient underwent several pharmacological trials, electroconvulsive therapy sessions and hospitalizations due to suicide attempts. In 2010, the patient underwent a VNS device implant with good response to VNS therapy. In 2014, after four years of good response to VNS therapy, benefits from VNS therapy stopped and the participant started his current depressive episode. In 2018, the patient decided to join a clinical trial of medial forebrain bundle DBS treatment.

VNS device was turned off about 6 weeks before DBS device implant. At some point during DBS treatment, participant concomitantly used ketamine with no symptoms remission. After 27 months under DBS therapy, in December 2020, the participant was still experiencing significant symptoms, and a decision was made to reactivate his VNS device. From that point, DBS and VNS were concomitantly administered. The patient's Montgomery-Asberg Depression Rating Scale (MADRS) scores were obtained starting 67 weeks before VNS device reactivation and until 30 weeks after DBS-VNS therapy begun, totalizing seven assessments (six assessments before and one assessment after the DBS-VNS therapy has started).

RESULTS

MADRS scores at 67 weeks, 65 weeks, 60 weeks, 51 weeks, 38 weeks and 12 weeks before the VNS reactivation were 18, 16, 29, 36, 27 and 13 respectively. After 30 weeks of joint stimulation with DBS and VNS, MADRS scores was 7. There were no severe side effects reported that could be attributed to the DBS-VNS treatment.

References:

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CONCLUSION

In this case report, the lowest level of depressive symptoms (MADRS score = 7) was reported during the concomitant use of two modalities of invasive neurostimulation, with no severe side effects. Further follow-up is necessary to investigate if the remission of the depressive symptoms and safety remain sustained.

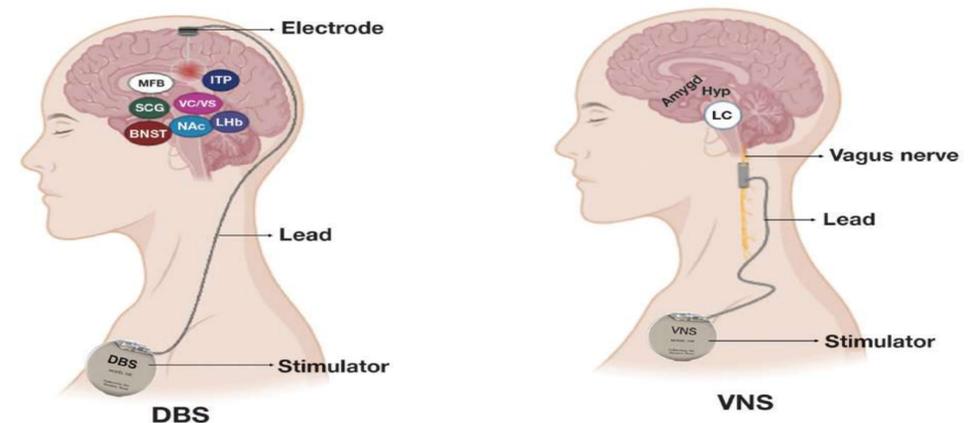


Figure 1: Schematic representation of invasive brain stimulation techniques (3)

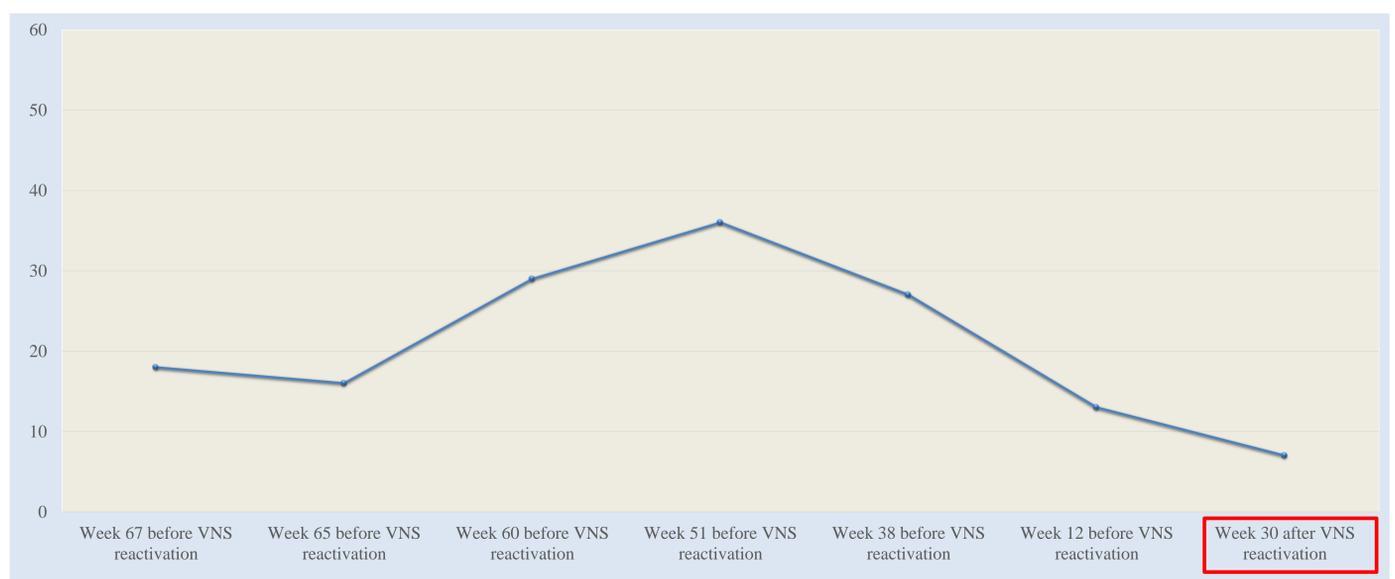


Figure 2: MADRS scores starting 67 weeks before VNS reactivation until 30 weeks after VNS reactivation

Disclosures: This work was partly supported by the Dunn Foundation of Houston. The authors report no conflicts of interest for this work.