

Deep brain stimulation as a last resort in some neuropathic pain cases. A case report.

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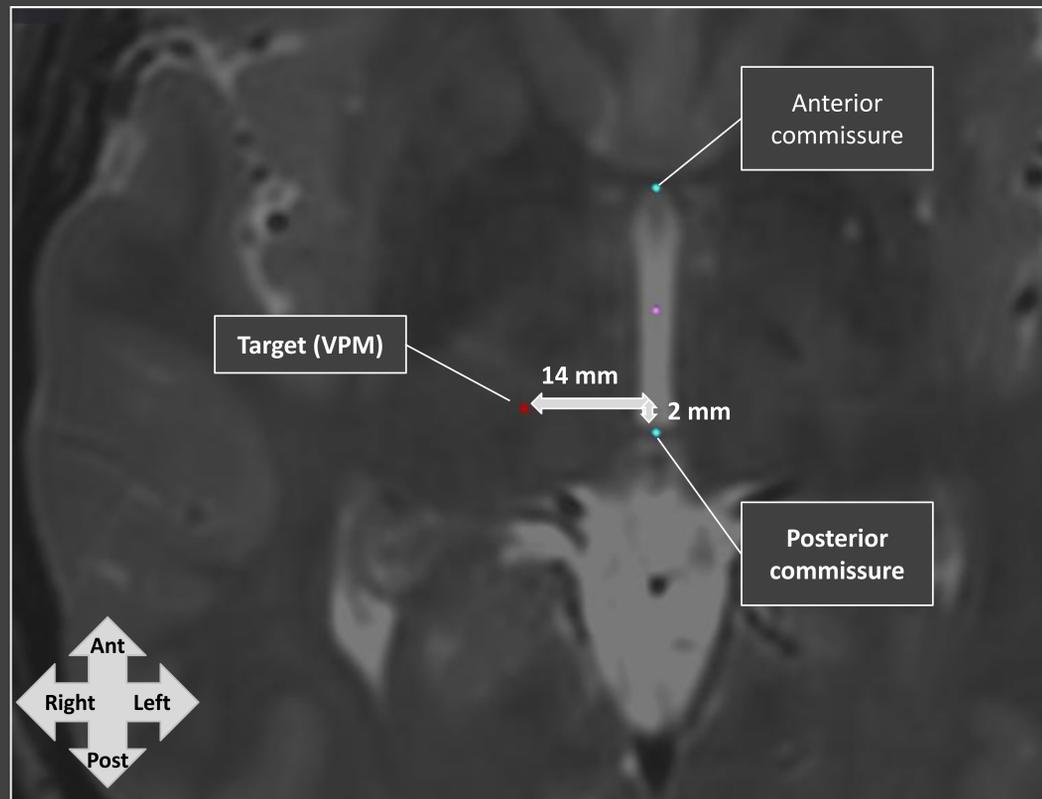
Introduction

Neuropathic pain due to damage to the peripheral nervous system is a common condition that can have a disastrous impact on the quality of life. The first line consists of conservative therapy with pharmacological treatments. If it fails, spinal cord stimulation or repetitive transcranial magnetic stimulation can be considered. In this case-report, we present a case where, given the failure of conservative therapy, we opted for deep brain stimulation (DBS) as a last resort. Pain has long been an indication for DBS with very favourable results. In recent years, however, this has been lost from practice due to insufficient qualitative studies.

Case report

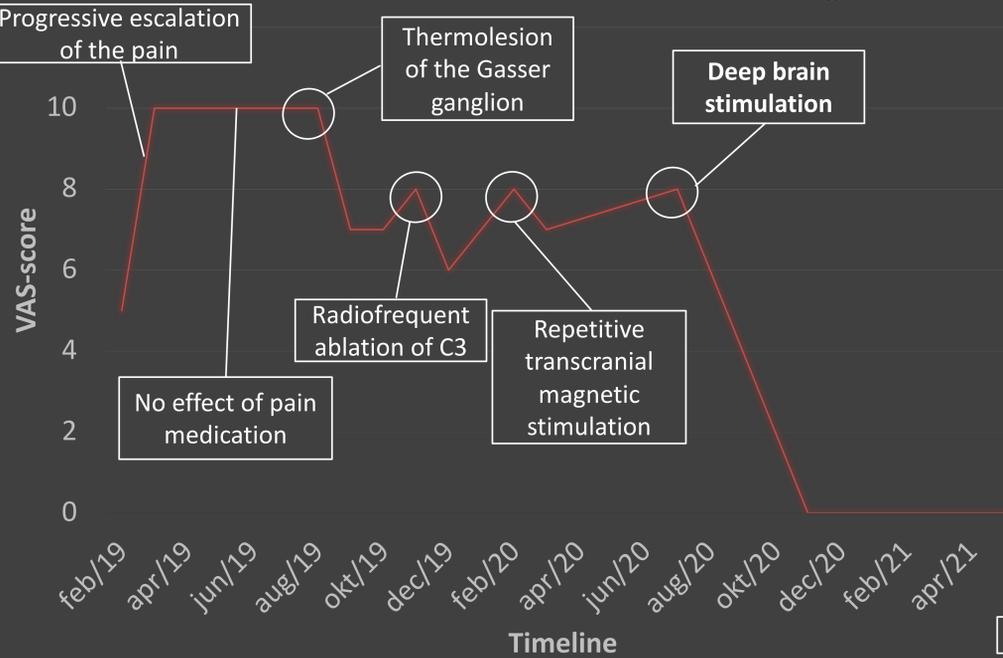
A 43 year old woman underwent a temporomandibular joint replacement in the context of bilateral internal TMJ derangement. Immediately after the surgery the patient reported left-sided hypoesthesia in V3 distribution and a couple of days later she developed a progressive hemifacial post-traumatic trigeminal neuropathic pain that evolved from 5/10 on the visual analog scale (VAS) till 10/10 over a couple of months.

Preoperative MRI (T2):



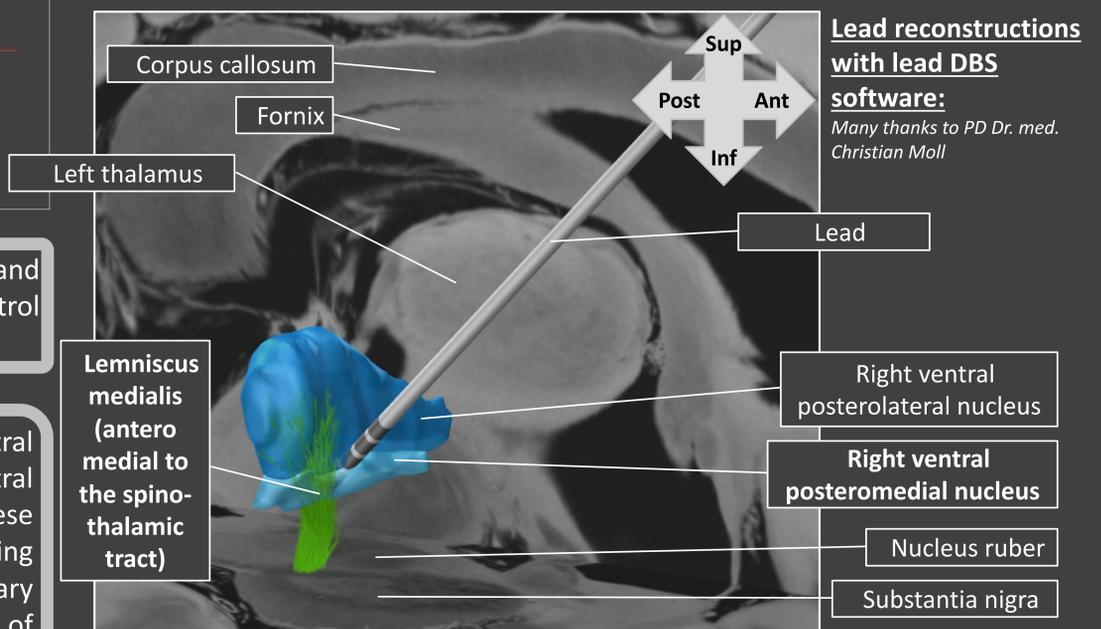
The VPM was defined as 2mm anterior and 14mm lateral to the posterior commissure as described in Gybels' article based on a preoperative 3 Tesla MRI (T1+gd; T2; PD). The implantation coordinates were obtained by merging this MRI with the stereotactic CT at the beginning of the procedure. During implantation, macrostimulation 5 mm before the target caused tingling in the face at 0.5mA, tingling in the left arm and leg at 1.5mA and no visible capsular side effects at 5mA. Measurements 2mm before target and 1mm past target gave similar findings. Finally the electrode (Medtronic 3389 DBS Lead) was implanted with the tip 1,5mm past target. Intra-operative CT with the O-arm confirmed a proper location of the lead.

Evolution of the pain score on the Visual Analog Scale



Medication, thermolesion of V1, V2 and V3, radiofrequent ablation of C3 and repetitive transcranial magnetic stimulation provided only limited pain control with a VAS score persistently above 5/10.

Since therapeutic options were exhausted, we opted for stimulation of the ventral posteromedial nucleus (VPM) of the thalamus. The VPM together with the ventral posterolateral nucleus (VPL) form the ventrobasal nuclei of the thalamus. These are organised somatotopically and are part of the lateral pain pathway, receiving information from the spinothalamic pathway and projecting to the primary sensory cortex. It plays a crucial role in the sensory discriminative quality of stimuli, responding to both innocuous and noxious stimuli. In rats with nerve injury, several studies show a lower threshold and enhanced peripherally-evoked responses independently of changes at the spinal level, suggesting a central sensitization. In addition, in these rats there is also an increased blood flow in these nuclei with a good relationship to the experienced pain. Stimulation at this level suppresses the neuronal activity evoked by noxious stimuli more than the activity evoked by innocuous stimuli, but the underlying mechanism is still unclear.



Lead reconstructions with lead DBS software:
Many thanks to PD Dr. med. Christian Moll

We observed a full control of the pain immediately postoperatively and still 10 months later with 0/10 on the VAS and an improvement in EQ-5D Usual activities score from 42 to 85/100.

Conclusion

We should reconsider DBS as a last-chance therapy in patients in whom less invasive procedures have failed.

References

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