



Occipital Nerve stimulation in refractory chronic cluster headache - a case report

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- Cluster headache (CH):** incapacitating form of primary headache.
 - 20% have chronic CH.
 - Subset have medical refractory CH - at least 3 severe attacks per week despite 3 trials of adequate preventive medical treatments (1,2).
- Pathophysiology:** altered trigeminal and occipital nerve functions (1).
- Occipital nerve stimulation (ONS):** promising minimally invasive resource for medical refractory CH,
 - Noteworthy reduction in attack frequency and pain intensity (3).

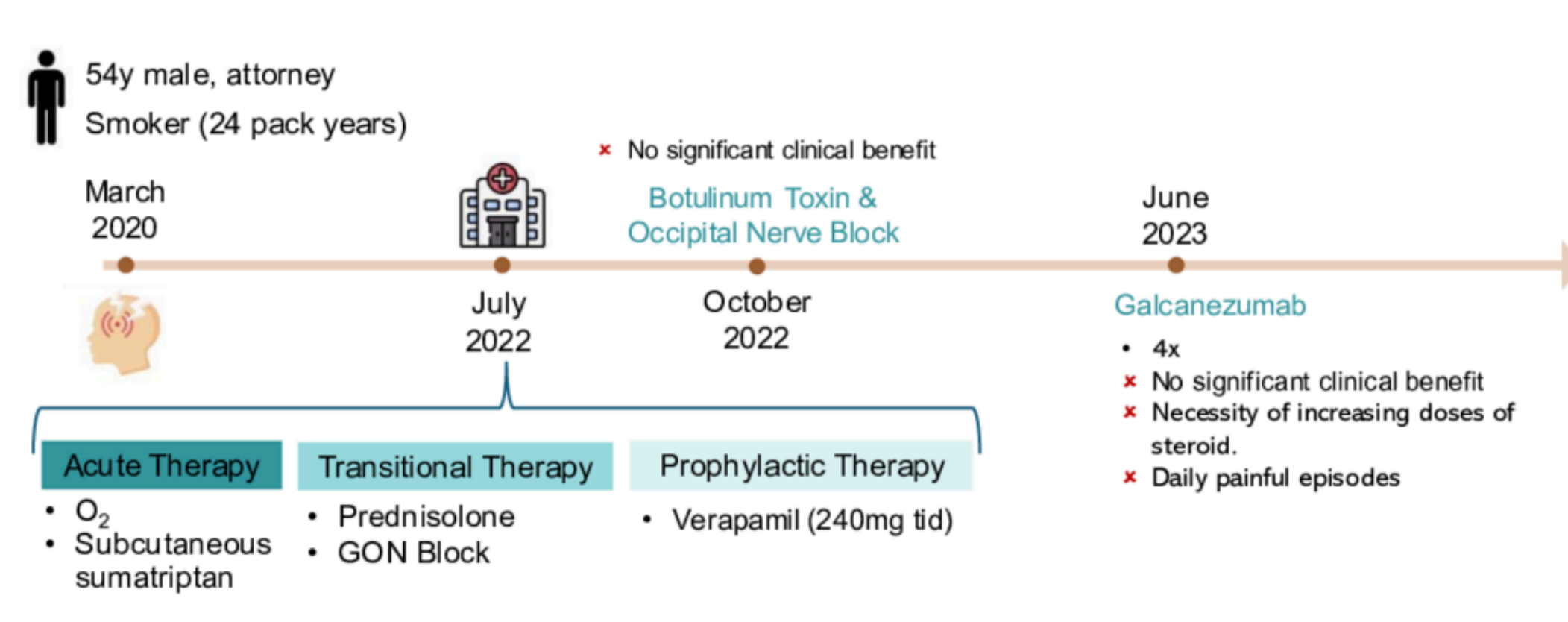


Figure 1 – Clinical Timeline. Symptoms began in March 2020 characterized by right-sided pain accompanied by conjunctival injection, lacrimation, and rhinorrhea, occurring three to four times daily lasting around one hour each. Initial therapeutic regimen comprised: Preventive Therapy - verapamil (240 mg thrice daily), the patient refused topiramate and lithium due to the potential side-effects; Transitional Therapy: oral prednisolone (increased attacks frequency in lower doses prevented dosage reduction) and occipital nerve blocks (with good but not sustained response); and Acute Therapy: subcutaneous sumatriptan, and supplemental oxygen. Due to the persistence and frequency of painful episodes, the patient underwent treatment with botulinum toxin, later transitioning to galcanezumab. Unfortunately, neither treatment yielded satisfactory results.

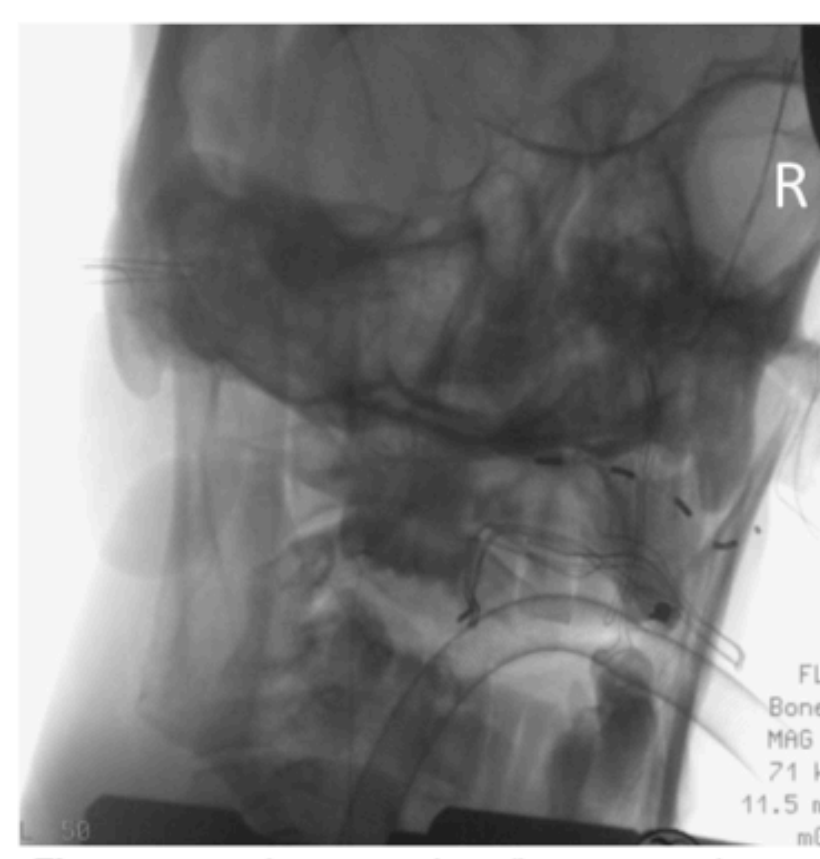


Figure 2 – Intraoperative fluoroscopy image demonstrating the final position of the electrode (AnkerStim®).

Right-sided ONS implantation was performed in **October 2023**. The patient was positioned prone with the head placed in a horseshoe head frame. The electrode (AnkerStim®) was inserted after a midline cervical incision at C1-C2 level and in a medial-to-lateral direction aiming to the mastoid process. **The final position is demonstrated in figure 2.** The wires of the electrodes were tunnelled caudally and connected to the implantable pulse generator (Vanta Medtronic®) placed in the right paravertebral dorsal region.

Preoperative and four-month postoperative assessments utilizing SF-36 version 2 and Brief Pain Inventory questionnaires revealed notable improvements in pain-related domains (figure 3 and 4).

The patient reported a 70% improvement in pain intensity and a reduction in the frequency of attacks.

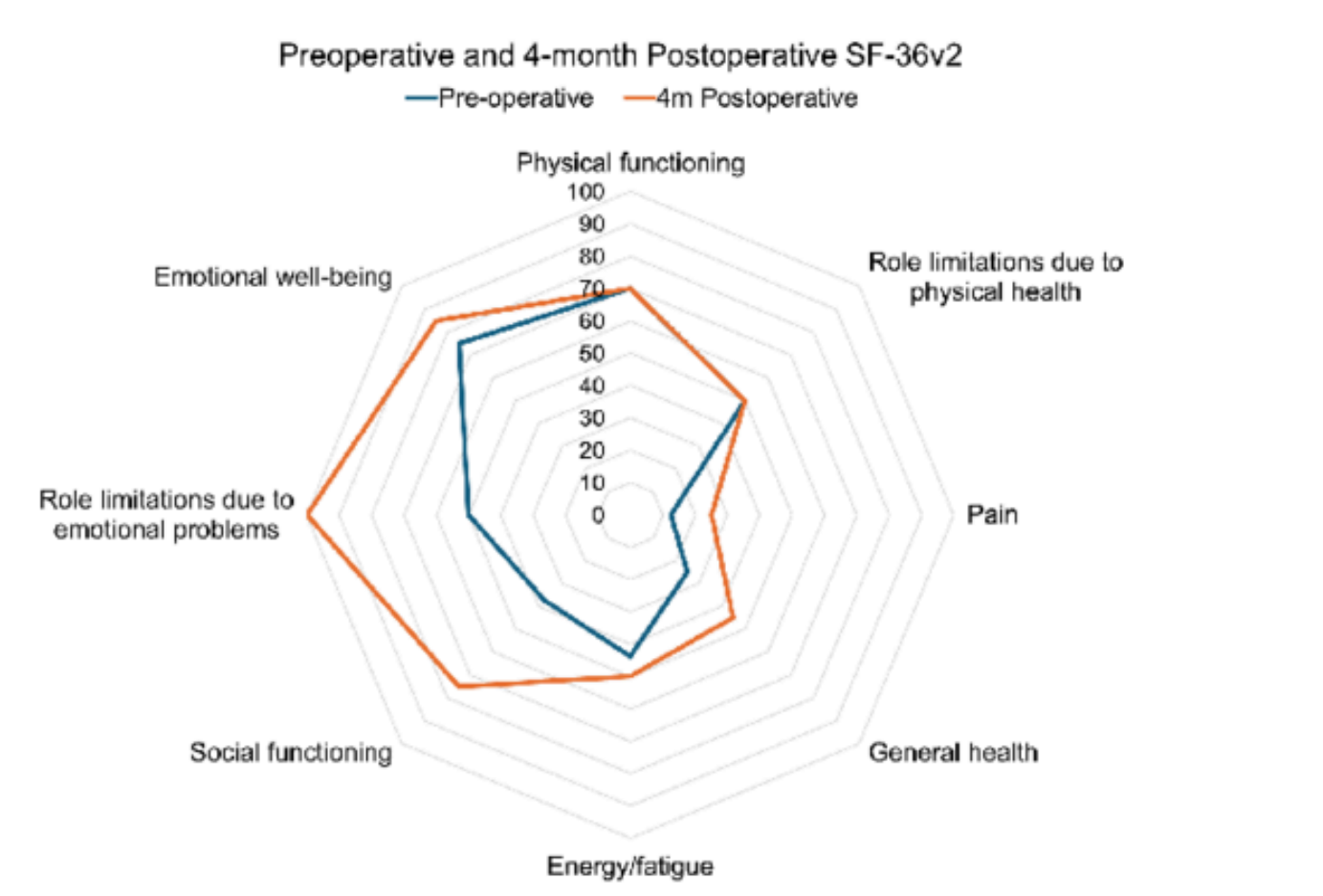


Figure 3 – Preoperative and four-month postoperative assessments of SF-36 version 2 questionnaire. A notable postoperative improvement in the domains related with the social functioning and role limitations due to emotional problems are shown. Also, is noteworthy the improvement in the general health domain.

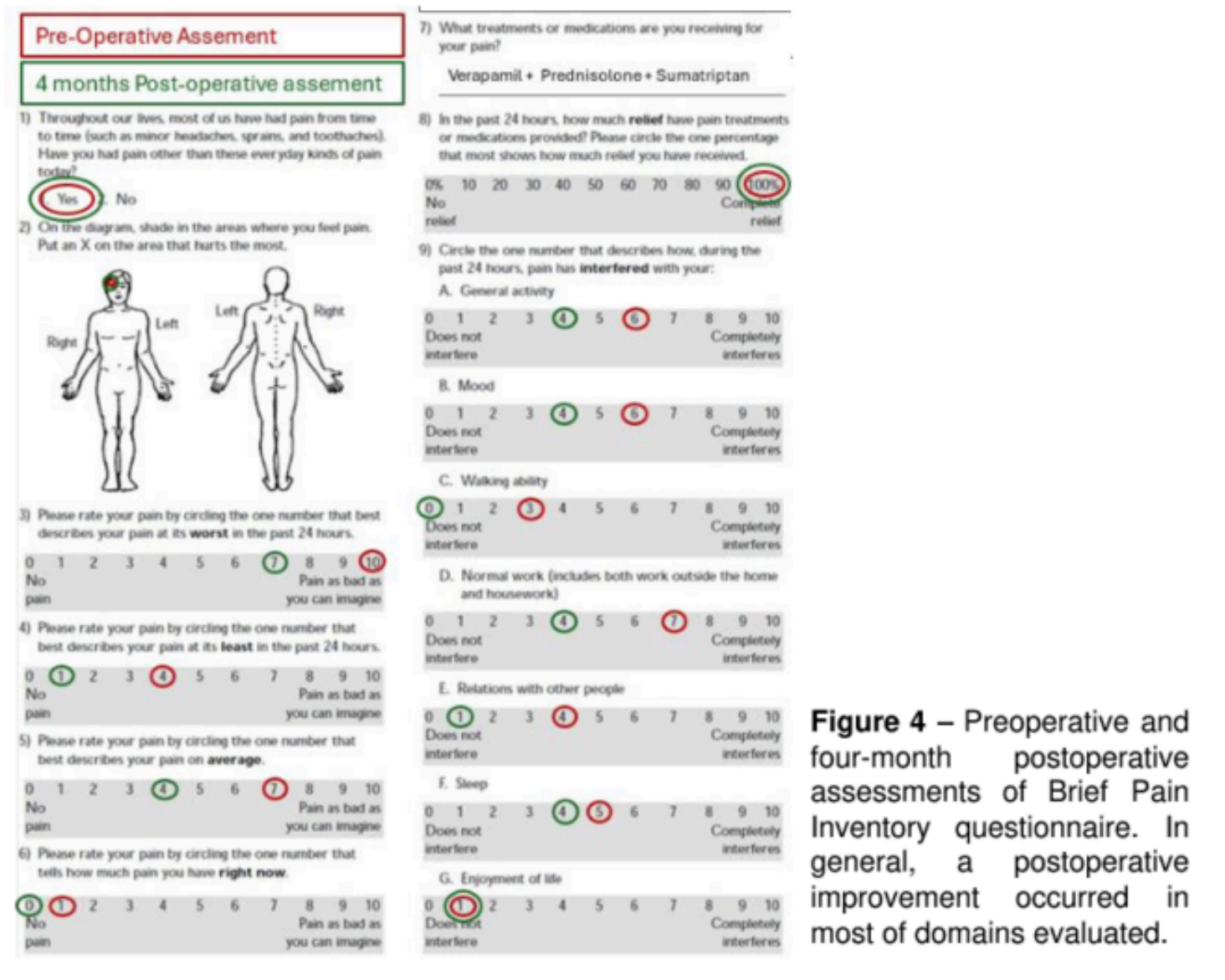


Figure 4 – Preoperative and four-month postoperative assessments of Brief Pain Inventory questionnaire. In general, a postoperative improvement occurred in most of domains evaluated.

In conclusion, occipital nerve stimulation, even if unilateral, represents a viable alternative in the therapeutic management of medically refractory chronic cluster headache, effectively reducing both pain intensity and frequency, as well improving quality of life in affected individuals.

References

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 2. Fogh-Andersen IS, et al. Treatment of chronic cluster headache with burst and tonic occipital nerve stimulation: A case series. *Headache*. 2023;63(8):1145-53.
 3. Membrilla JA, et al. Preventive treatment of refractory chronic cluster headache: systematic review and meta-analysis. *Journal of Neurology*. 2023;270(2):689-710.

