Occipital nerve stimulation for cluster headache

Occipital nerve stimulation (ONS) has been proposed chronic cluster headache treatment (rCCH) but its efficacy has only been showed in small short-term series.

Leplus et al. evaluated 105 patients with rCCH, treated by ONS within a multicenter ONS prospective registry. Efficacy was evaluated by frequency, intensity of pain attacks, quality of life (QoL) EuroQol 5 dimensions (EQ5D), functional (Headache Impact Test-6, Migraine Disability Assessment) and emotional (Hospital Anxiety Depression Scale [HAD]) impacts, and medication consumption.

At last follow-up (mean 43.8 mo), attack frequency was reduced >50% in 69% of the patients. Mean weekly attack frequency decreased from 22.5 at baseline to 9.9 ($P < .001$) after ONS. Preventive and abortive medications were significantly decreased. Functional impact, anxiety, and QoL significantly improved after ONS. In excellent responders (59% of the patients), attack frequency decreased by 80% and QoL (EQ5D visual analog scale) dramatically improved from 37.8/100 to 73.2/100. When comparing baseline and 1-yr and last follow-up outcomes, efficacy was sustained over time. In multivariable analysis, low preoperative HAD-depression score was correlated to a higher risk of ONS failure. During the follow-up, 67 patients experienced at least one complication, 29 requiring an additional surgery: infection (6%), lead migration (12%) or fracture (4.5%), hardware dysfunction (8.2%), and local pain (20%).

The results showed that long-term efficacy of ONS in CCH was maintained over time. In responders, ONS induced a major reduction of functional and emotional headache-related impacts and a dramatic improvement of QoL. These results obtained in real-life conditions support its use and dissemination in rCCH patients [1].

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33 patients, of whom 16 had chronic migraine (CM), nine had chronic cluster headache (CCH), and six had secondary headache disorders. PENS was given using Algotec® disposable 21 gauge PENS therapy probes (8 cm) to the occipital nerve ipsilateral to the pain (or bilaterally in cases of bilateral pain). Stimulation was delivered at 2 Hz/100 Hz, at 3 cycles/s, between 1.2 and 2.5 V depending on patient tolerability, for 25-28 min.

Six of nine patients with CCH improved significantly after the first session. In all patients with CCH, PENS therapy was well tolerated, with no significant adverse events reported. One patient with CCH reverted to an episodic cluster. Only four patients with CM experienced any benefit.

PENS therapy shows potential as a relatively non-invasive, low-risk, and inexpensive component of the treatment options for refractory primary headache disorders, particularly CCH [2].

Seventeen patients (12 CM and 5 CCH) were treated with bilateral burst pattern ONS, including 4 who had previously had tonic ONS. Results were assessed in terms of the frequency of headaches (number of headache days per month for CM, and number of attacks per day for CCH) and their intensity on the numeric pain rating scale.

Burst ONS produced a statistically significant mean reduction of 10.2 headache days per month in CM. In CCH, there were significant mean reductions in headache frequency (92%) and intensity (42%).

Paraesthesia is not necessary for good quality analgesia in ONS. Larger studies will be required to determine whether the efficacies of the two stimulation modes differ. Burst ONS is imperceptible and therefore potentially amenable to robustly blinded clinical trials [3].

Eight patients with medically intractable chronic cluster headache were implanted in the suboccipital region with electrodes for occipital nerve stimulation. Other than the first patient, who was initially stimulated unilaterally before being stimulated bilaterally, all patients were stimulated bilaterally during treatment.

At a median follow-up of 20 months (range 6-27 months for bilateral stimulation), six of eight patients reported responses that were sufficiently meaningful for them to recommend the treatment to similarly affected patients with chronic cluster headache. Two patients noticed a substantial improvement (90% and 95%) in their attacks; three patients noticed a moderate improvement (40%, 60%, and 20-80%) and one reported mild improvement (25%). Improvements occurred in both frequency and severity of attacks. These changes took place over weeks or months, although attacks returned in days when the device malfunctioned (eg, with battery depletion). Adverse events of concern were lead migrations in one patient and battery depletion requiring replacement in four.

Occipital nerve stimulation in cluster headache seems to offer a safe, effective treatment option that could begin a new era of neurostimulation therapy for primary headache syndromes [4].

References

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