▪ Headache Medicine 2026, Supplement ▪ p-ISSN 2178-7468, e-ISSN 2763-6178

Headache Medicine

ID: 396

Spinal cord neuromodulation for refractory chronic migraine: a case report

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Introduction
Chronic migraine is defined as headache on 15 or more days per month, with migrainous features on at least eight days, for more than three months. It is a major cause of neurological disability and can impair quality of life and occupational functioning. In patients refractory to optimized therapy, spinal cord stimulation (SCS) has been explored as a neuromodulatory alternative, although evidence remains limited. This report describes a patient with refractory chronic migraine treated with high cervical SCS.

Case presentation
A 75-year-old woman with a four-year history of chronic migraine presented with daily severe pulsatile headaches associated with nausea, photophobia, and phonophobia, lasting approximately 14 hours. Previous therapies included topiramate, amitriptyline, propranolol, valproate, and three anti-CGRP monoclonal antibodies (erenumab, fremanezumab, and galcanezumab), without sustained response. She also presented analgesic overuse and progressive functional decline. After multidisciplinary evaluation, SCS was proposed. The procedure was performed in two stages. During the trial phase, percutaneous electrodes were placed at C2–C3 under local anesthesia and conscious sedation, and clinical response was assessed over 14 days. The patient reported a 60% reduction in headache frequency and intensity, with improvement in daily functioning. Due to the favorable response, a permanent subcutaneous pulse generator was implanted. Parameters were adjusted to 40 Hz, 300 µs pulse width, and 2.5 mA amplitude. No complications occurred, and the patient was discharged within 48 hours.

Discussion
This case illustrates the potential role of SCS in selected patients with refractory chronic migraine after multiple treatment failures, including oral preventives and anti-CGRP monoclonal antibodies. Analgesic overuse may contribute to chronification, although mechanisms remain incompletely understood. The 60% reduction in headache frequency and intensity was clinically meaningful; however, isolated case outcomes cannot be generalized. High cervical stimulation may modulate the trigeminocervical complex and influence nociceptive transmission. Current evidence is mainly derived from case reports and observational series, with relevant limitations. Controlled trials are required to define selection criteria, parameters, efficacy, and safety.

Conclusion
Spinal cord neuromodulation may represent a promising option for selected patients with refractory chronic migraine who have failed conventional treatment. In this case, SCS was associated with substantial clinical improvement and no immediate complications. However, broader recommendations depend on controlled studies with long-term follow-up to clarify efficacy, safety, and the profile of patients most likely to benefit.

Keywords:
Chronic migraine
Neuromodulation
Refractory migraine

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