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Video Abstract

Microsurgical right-sided occipital neurectomy for intractable neuralgia

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ABSTRACT

Background: Occipital neuralgia (ON) is unilateral or bilateral paroxysmal shooting/stabbing pain in the occipital part of the scalp. It may be accompanied by dysesthesia and tenderness over the involved nerve(s). Possible pain generators include the greater occipital nerve (GON) (90%), lesser occipital nerve, and third occipital nerve (10%). Management includes non-surgical and various surgical approaches.

Case Description: A 28-year-old female presented with severe right-sided ON that failed conservative management. The unilateral pain was paroxysmal in the sensory distribution of the right GON. The cervical spine magnetic resonance imaging was unremarkable. Initial treatment consisted of 6-months of pharmacological therapy without sustained benefit. Three therapeutic right-sided GON blocks resulted in consistent, but short-lived pain relief; this supported the diagnosis of a peripheral nerve-mediated pain mechanism. The patient opted for a microsurgical neurectomy of the right GON; it included division of the right C2 dorsal ramus (GON), preserving the ventral ramus and dorsal root ganglion. Postoperatively, the patient's pain resolved (i.e., with the anticipated sensory deficit in the affected nerve territory). At 1-year follow-up, the patient remained pain-free with partial sensory recovery, (i.e., likely due to compensatory innervation).

Conclusion: This video demonstrates how to perform a microsurgical occipital neurectomy that provided durable pain relief in this 28-year-old patient who suffered from intractable ON.

Keywords: Microsurgery, Neurectomy, Occipital nerve, Occipital neuralgia

[Video 1]-Available on:
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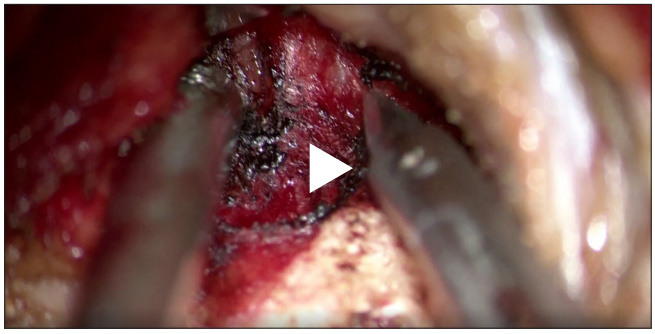
Occipital neuralgia (ON) is unilateral or bilateral paroxysmal shooting/stabbing pain in the occipital part of the scalp.[9] It may be accompanied by dysesthesia and tenderness over the involved nerve(s).[7] Possible pain generators include the greater occipital nerve (GON) (90%), lesser occipital nerve, and third occipital nerve (10%).[4,5] Management includes non-surgical[2,5,8,10,15] and various surgical approaches.[4,5,8,10,11,13,14,16,17] To our knowledge, this is the first video demonstration of microsurgical occipital neurectomy from the few available studies of ON surgery in the literature [Table 1].[1,3,6,8,11,12,13,16,17]

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Table 1: Published clinical cases and series of surgical treatment of ON.

Author [Reference] Journal Year	Study design	Case No.	Follow-up	Outcome Measure	Outcomes
Ducic *et al*.[6] Plast Reconstr Surg 2009	Retrospective series	206	Min 12 mo	VAS; migraine headache index; success=pain reduction ≥50%	GON neurolysis (*n*=190) or GON and/or LON excision (*n*=16). ≥50% relief in 166 pts (80.5%); complete relief in 72 (43.4%). Mean VAS 7.9±1.4–1.9±1.8. Two minor complications (incisional cellulitis).
Finiels and Batifol[8] Neurochirurgie 2016	Retrospective series	111	Min 6 mo (mean 22 mo, range 6–105, for excellent RF results)	VAS; modified Macnab criteria (excellent/good/average/poor)	RF denaturation (*n*=78): 85.4% excellent/good. Botulinum toxin (*n*=37): 75.7% excellent/good. Nerve stimulation (*n*=5): 80% excellent. Two serious RF complications (1 death, 1 Brown-Séquard syndrome)
Choi *et al*.[3] Acta Neurochir (Wien) 2015	Retrospective series	68	Mean 31.3 mo (range 18–68); assessed at 1 and 5 y	VAS; headache severity and medication use; success = ≥50% relief without medication	C2 ganglion decompression (bilateral in 37 pts). Excellent/good in 57 pts (83.8%) at 1 y and 55 (80.9%) at 5 y; therapeutic success in 47 (69.1%). Complications: transient ipsilateral C2 hypoesthesia in 11 (16.1%) pt (s)
Lozano *et al*.[12] J Neurosurg 1998	Retrospective series	39	19–48 mo	Pain reduction graded excellent (>90%), good (50–90%), failed (<50%)	Microsurgical C2 ganglionectomy (unilateral *n*=24, bilateral *n*=15). Excellent in 19 pts, good in 7, failure in 13. Deafferentation pain in 1 pt (2.6%)
Acar *et al*.[1] Stereotact Funct Neurosurg 2008	Retrospective series	20	Mean 42.5 mo (range 18–75)	VAS; duration of relief	C2 (*n*=4), C3 (*n*=5) or consecutive C2 and C3 ganglionectomy (*n*=11). Mean VAS 9.4–2.6. Short-term relief in 95%. Long-term: excellent 20%, moderate 40%, poor 40%.
Jung *et al*.[11] Korean J Pain 2011	Case report	1	5 mo	VAS; clinical assessment	Bilateral GON and LON neurectomy guided by transcranial Doppler sonography (preop VAS 8.9). Headache resolved; all medication stopped except antidepressants.
Magalhães and Nunes[13] Arq Bras Neurocir 2020	Case report	1	6 mo	Clinical assessment of pain and sensory function	Bilateral C2 neurectomy proximal to the DRG (ganglion included) after failed GON rhizotomy. Pain improved at 4 wk with residual cervical discomfort and bilateral occipital hypoesthesia; sustained at 6 mo.
Wang and Levi[16] Neurosurg Focus 2002	Case report	1	NA (discharged POD 2)	10-point pain scale; clinical assessment	C2 DRG ganglionectomy (preop pain 10/10). Good relief; ipsilateral occipital numbness without other deficit.
Yu *et al*.[17] Oper Neurosurg 2021	Case report	1	12 mo	VAS; clinical assessment	Percutaneous full-endoscopic C2 ganglionectomy (preop VAS 9). Postop VAS 2–3; mild occipital numbness resolved within 1 wk; no recurrence at 12 mo.

CSF: Cerebrospinal fluid, DRG: Dorsal root ganglion, FU: Follow-up, GON: Greater occipital nerve, LON: Lesser occipital nerve, min: Minimum, mo: Months, NA: Not available, No: Number, ON: Occipital neuralgia, POD: Postoperative day, Postop: Postoperative, preop: Preoperative; pt (s): Patient (s), RF: Radiofrequency, VAS: Visual analog scale, wk: Weeks, y: Years



Video 1: Occipital neurectomy video.

Annotations

1) 00:10 – Clinical presentation
2) 02:44 – Description of the setup
3) 04:16 – Operative video
4) 07:51 – Disease background
5) 08:51 – Overview of clinical outcome

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Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given consent for their images and other clinical information to be reported in the journal. The patient understands that the patient's names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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