Case Report
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Trigeminal neuralgia management after microvascular decompression surgery: two case reports

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Trigeminal neuralgia (TN) involves chronic neuropathic pain, characterized by attacks of repeating short episodes of unilateral shock-like pain, which are abrupt in onset and termination. Anticonvulsants, such as carbamazepine, are the gold standard first-line drugs for pharmacological treatment. Microvascular decompression (MVD) surgery is often the course of action if pharmacological management with anticonvulsants is unsuccessful. MVD surgery is an effective therapy in approximately 83% of cases. However, persistent neuropathic pain after MVD surgery may require reintroduction of pharmacotherapy. This case report presents two patients with persistent pain after MVD requiring reintroduction of pharmacological therapy. Although MVD is successful for patients with failed pharmacological management, it is an invasive procedure and requires hospitalization of the patient. About one-third of patients suffer from recurrent TN after MVD. Often, alternative treatment protocols, including the reintroduction of medications, may be necessary to achieve improvement. This case report presents two cases of post-MVD recurrent pain. Further research is lacking on the success rates of subsequent medication therapy after MVD has proven less effective in managing TN.

Keywords: Carbamazepine; Case Reports; Gabapentin; Microvascular Decompression Surgery; Trigeminal Neuralgia.

INTRODUCTION

Trigeminal neuralgia (TN) is a short episode of electric shock-like nerve pain. It is typically unilateral and triggered by innocuous stimuli (light touch or tooth brushing) [1]. TN affects women more than men, with an annual incidence of 3-6 per 100,000 population [2]. In a case series of glossopharyngeal neuralgia, the incidence increased with age, with most cases developing after the age of 50 years [3]. Anticonvulsants, such as carbamazepine, are the standard first-line therapeutic agents [4]. Gabapentin can be titrated rapidly, with fewer drug interactions, and no known idiosyncratic dermatological effects [5]. For patients with pharmacotherapy- refractory TN refractory, surgical therapy may be considered, such as gamma knife and microvascular decompression (MVD) [6]. We report the reintroduction of different combinations of medications after failed MVD in two cases.

CASE REPORT #1

A 51-year-old Hispanic woman with a medical history

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Table 1. Summary of patient encounters

Visit #	Initial prescription	VAS pain and adverse reactions	Medication changes
1	200 mg carbamazepine 300 mg gabapentin	10/10 light touch Dizzy/Sleepiness	Gabapentin 300 mg tab 1 tab at night for 4 days. 1 tab at night 1 tab in morning for 4 days. 2 tabs at night and 1 tab in the morning. 2 tabs at night and 1 tab in the morning and 1 tab at lunch.
2 (2 weeks later)	Gabapentin 300 mg escalating doses. Patient takes 300 mg TID	10/10 light touch Severe side effects and multiple panic attacks.	Gabapentin was discontinued. Carbamazepine titration: 50 mg in the morning 50 mg at lunch time and 50 mg at night for 3 days. Following this, if patient has no side effects progress to 50 mg in the morning, 50 mg at lunch time, and 100 mg at night.
3 (5 weeks later)	Carbamazepine 100 mg (50 mg am 50 mg night)	0/10 past 2 weeks Muscle weakness and panic attacks.	Increase 50 mg the dosage of carbamazepine in the morning to avoid relapse of previous symptoms; if patient starts feeling less painful episodes, she can decrease the dosage again.
4 (3 months later)	Carbamazepine 100 to 150 mg/day.	Severe pain (no VAS was obtained).	Patient was instructed to take 100 mg in the morning, 100 mg at noon, and 100 mg at night. If symptoms did not improve dosage could be increased to 150 mg TID.
5 (1 week later)	Carbamazepine 300 mg/day (100 mg in the morning, 100 mg at noon, and 100 mg at night).	Improved Less sensations of needle pricks; however, tolerable low-level pain. Dizziness but less severe.	Carbamazepine 300 mg/day 100 mg in morning 100 mg at noon 100 mg at night.

VAS, visual analog scale; TID, thrice daily.

of type 2 diabetes was referred to the Orofacial Pain clinic owing to persistent facial pain. The initial triggering event occurred 4 years prior, associated with right lower third molar surgery. There were no known complications from the surgery; therefore, the patient was referred for neurological evaluation. The neurologist recommended anticonvulsants; however, the patient, unable to recall the dosing, took acetaminophen with codeine when needed. Owing to severe dizziness caused by the suggested dose, the patient did not comply with the recommended protocol. MVD surgery was performed, and carbamazepine 200 mg and gabapentin 300 mg were prescribed. Considering the persistent pain and the medications' side effects, she was referred to the Orofacial Pain clinic for a second opinion. The patient described her pain as severe, with a visual analog scale (VAS) score of 10/10, elicited by light touching of the right jaw lasting from 2 to 5 min; she was prescribed gabapentin 300 mg, gradually increased to therapeutic dosage (Table 1).

At the second visit (2 weeks later), she reported taking gabapentin 300 mg up to thrice daily (TID), without pain relief; however, she reported severe anxiety and trembling hands. A low-dose regimen of carbamazepine 50 mg thrice daily was prescribed, with gradual increase if adverse reactions were not experienced.

At visit 3 (5 weeks later), she reported a reduction in severe facial pain attacks; however, she visited the emergency department owing to a panic attack and weakness. Weakness is a common side effect and should be considered while prescribing gabapentin. Patients can also develop changes in glycemic levels, with mental-state alterations [7].

At visit 4 (3 months later), she still reported pain; however, the dosage was increased. On laboratory assessment, carbamazepine levels were low (2.8 μg/mL), and the dose of carbamazepine was increased to 300 mg daily (100 mg, TID). Further escalation to 150 mg TID or 450 mg per day was recommended, if needed. Frequent communication, follow-up, and patient compliance are essential for pharmacological pain management.

A telephonic conversation 1 week after visit 4 revealed improvement of her condition with the suggested

Table 2. Summary of patient encounters

Visit #	Initial prescription	VAS Pain and adverse reactions	Medication prescription
1	Over the counter Tylenol 600 mg.	6/10	10 mg Cyclobenzaprine bid. (Initial diagnosis related with) muscle pain).
2 (after 1 month)	10 mg Cyclobenzaprine bid for 7 days.	6/10; however, patient reports improvement.	No changes on prescription.
3 (after 1 month)	No prescription.	Patient reports improvement. No VAS is reported.	No prescription.
4 (18 months after last visit)	Over the counter Tylenol 600 mg.	4-5/10 pain changed to severe electric-like, located in the right)lower jaw (intraorally).	Carbamazepine 200 mg, and topical anesthetic (benzocaine 20%))over the painful area.
5 (1 month later)	Pain remission. Patient)discontinued medications.	0/10	The patient is instructed to continue the prescription of)Carbamazepine 200 mg per day.
6 (5 months later)	Pain reoccurred.) Carbamazepine 200 mg bid and pregabalin was prescribed by her primary)physician; however, the patient reported side effects and did not take pregabalin.	5/10, with severe episodes of 7-8/10. Mild dizziness, weakness and memory problems. The patient is referred to neurologist for further management.	Carbamazepine 200 mg tid (with close follow-up for side)effects).
7 (6 months after last visit)	Carbamazepine 200 mg TID with severe side effects. The patient underwent MVD surgery)(recommended by treating neurologist).	The pain in intraoral area did not subside completely (no VAS)was obtained).	Oxcarbazepine 900 mg in three doses (prescribed by neurologist). Topical anesthetic (benzocaine 20%) over the painful area. Gabapentin 100 mg qd for 30 days. Nabumetone 500 mg bid for 2 weeks.
8 (2-week follow-up)	Oxcarbazepine 900 mg in three doses (prescribed by neurologist). Topical anesthetic (benzocaine 20%) over the painful area. Gabapentin 100 mg qd for 30 days.	Not recorded VAS, but patient reports persistent severe episodes.	No changes on prescription.
9 (5 months later)	Oxcarbazepine 1200 mg in three doses (prescribed by)neurologist).	2/10 with episodes of 10/10.	The patient was referred to a second MVD surgery.
10 (phone call – 5 months later)	Oxcarbazepine 900 mg in three doses (prescribed by neurologist).	Second MVD improved symptoms. 2/10.	Patient continues pharmacological treatment and is under the)care of her neurologist.

VAS, visual analog scale; MVD, microvascular decompression.

protocol. At 5 weeks after visit 4, the patient reported significant relief (no VAS was obtained), which is currently maintained with a carbamazepine dosing protocol of 100 mg TID.

CASE REPORT #2

A 48-year-old healthy woman presented with difficulty in mouth opening with pain in the left masseter, and a shocking pain on touching the left side of her face. The pain initiated after a root canal therapy on tooth #18 performed 4 months prior. She was initially diagnosed with myofascial pain that was prescribed home-based physical therapy and a 7-day muscle relaxant course, cyclobenzaprine 10 mg (one tablet twice daily).

At the second and third follow-up visits, the patient felt remarkable pain relief and was advised to continue thermal therapy and stretching exercises. After 18 months (visit 4), she reported severe electric shock-like pain in her right lower jaw, which lasted 10 s and subsided to a score of 4-5/ 10 on a VAS after 30 min. She also experienced continuous pain in the buccal gingiva of teeth 18-20. She was diagnosed with TN and prescribed carbamazepine 200 mg once before bedtime and topical application of benzocaine 20% on the affected area (Table 2). The patient was referred to a neurologist, and a non-contrast magnetic resonance imaging (MRI) was also

recommended to exclude neurological pathology. At visit 5, she returned for follow-up after MRI and laboratory tests. She pain remission, and her MRI results were normal. However, owing to a positive antinuclear antibody test and butterfly skin rash, she was referred to a rheumatologist for further evaluation of possible systemic lupus erythematous. Approximately 5 months later, at visit 6, she indicated that following a pain-free period, her symptoms had reemerged after extraction of tooth 18. She was managing the pain with carbamazepine 200 mg twice daily; however, she had mild dizziness and weakness, memory loss, and pain levels of 5/10. Since the adverse reactions were tolerable and not life-threatening, the carbamazepine dosage was increased to 600 mg (200 mg TID) for 2 weeks.

At visit 7, approximately 6 months later, the patient underwent MVD surgery (recommended by the neurologist), since carbamazepine was now unable to provide pain relief. The symptoms improved for the first 3 days after surgery; however, it recurred shortly thereafter. Her neurologist subsequently prescribed oxcarbazepine for managing postoperative pain recurrence. To rule out peripheral neuropathy, topical anesthetic was delivered using a protective intraoral tray (acrylic stent). Gabapentin (100 mg four times a day for 30 days) was added to the topical therapy for addressing possible peripheral neuropathy.

At visit 8 (a 2-week follow-up for reassessing the effect of the topical stent and gabapentin usage), considering pain persistence, the patient was instructed to use a topical stent thrice daily for 20 min per session.

At visit 9, she still had substantial pain on the left side of her face despite taking 900 mg of oxcarbazepine. She was advised to increase the oxcarbazepine dosage to 1200 mg per day.

At visit 10, the patient was accessible only telephonically. She had a second MVD surgery. Despite complete pain resolution, she reported unilateral facial numbness, a common side effect of the surgery, as a complication. The patient was comfortable, unaffected by the numbness; pain was completely absent. The patient is continuing pharmacological treatment and is under the care of her neurologist.

DISCUSSION

The two cases presented here indicate the need for maintaining pharmacotherapy to provide pain relief for TN patients after MVD surgeries. The first line of treatment for TN is with anticonvulsants [4] such as carbamazepine and oxcarbazepine [8]; however, gabapentinoids are also used. A systematic review noted strong treatment response of carbamazepine, with effective pain control in 58-100% of patients, and with a number needed to treat below 2. However, patients sometimes tolerated carbamazepine poorly, with a number needed to harm of 24 for severe adverse effects [9]. Carbamazepine may be contraindicated in certain ethnic groups and results in severe hypersensitivity reactions such as Stevens-Johnson in Asians with an HLA-B*1502 gene. The Food and Drug Administration of the United States recommended the labeling of the drug as to be screened for this genetic marker before its use [10]. Oxcarbazepine is a newer antiepileptic drug that has shown fewer adverse drug reactions [11].

Gabapentin is effective in treating neuropathic pain in randomized controlled trials [5,12]. Additionally, gabapentin is a therapeutic agent for the management of TN, with a favorable side-effect profile, mild somnolence, and dizziness [13,14]. Hyperlipidemia is an important side effect of gabapentin [15]. The use of pregabalin, another gabapentinoid, has gained support among clinicians, and was used for treating neuropathic pain in a cross-sectional study conducted in Australia [16]. Pregabalin has higher potency, quicker absorption rates, and greater bioavailability levels than gabapentin [17].

In a systematic review and meta-analysis detailing the results of MVD for TN, which included 3897 patients from 46 studies, long-term pain freedom was favorable. For cases that do not respond to medications, MVD surgery is effective in approximately 76% of the patients

[18]. MVD is an invasive procedure involving an open craniotomy and requires hospitalization. Approximately one-third of patients report recurrent TN after MVD. Anxiety and depression are associated with more failures after MVD surgery [19]. In the first case, the patient had panic attacks, possibly increasing her anxiety and sensitizing the patient to perceive more pain. Therefore, cognitive and behavioral therapy may improve the outcomes of TN management. Statistically significant predictors for excellent long-term outcome of MVD are typical clinical presentation, arterial neurovascular compression, and older age (≥ 60 years) [20].

This case series analyzed two cases of refractory TN, which improved using medications following unsuccessful MVD. Patient understanding is critical to achieving adequate medication protocol. Patients show good prognosis when TN is treated with combination therapies. Further research is lacking on the success rates of managing TN using medications after incompletely successful surgery.

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