Vol 1. Iss. 1 (January-June, 2025)

*Case Report*

# Botulinum toxin type A treatment for Trigeminal Neuralgia: Case Report of a patient unresponsive to pharmacotherapy

Monika Fida[1*], Valbona Alliu[2], Vladimir Filaj[3] and Ina Sotiri[1]

[1]*University of Medicine of Tirana, Department of Dermatology and Venerology, University Hospital Centre "Mother Theresa", Tirana, Albania;*
[2]*Faculty of Technical Medical Sciences, University of Medicine of Tirana, Albania;*
[3]*Plastic and Reconstructive Surgery Department, University Hospital Center "Mother Theresa", Tirana, Albania*

**KEYWORDS**

*Trigeminal Neuralgia, Botulinum toxin type A, pain relief*

**ABSTRACT**

Trigeminal Neuralgia (TN) is a chronic neuropathic disorder characterized by episodic, sharp facial pain, often unresponsive to standard pharmacologic treatments. This case report presents a 51-year-old female with classical TN affecting the right maxillary branch (V2), who experienced inadequate relief from conventional anticonvulsants and declined surgical intervention. Botulinum toxin type A (BTX-A) was administered intradermally at the sites of pain, following a protocol based on prior literature. Two weeks post-treatment, the patient reported a significant reduction in pain intensity—from a Visual Analog Scale (VAS) score of 9/10 to 3/10—and decreased frequency of attacks. Symptom relief persisted for approximately 4.5 months with no observed adverse effects. This report highlights BTX-A as a promising alternative therapy for refractory TN, especially in patients unsuitable for invasive procedures. Further studies are warranted to evaluate long-term efficacy and safety.

**CORRESPONDING AUTHOR**

Prof. As. Monika Fida
University of Medicine of Tirana, Department of Dermatology and Venereology, University Hospital Centre "Mother Theresa",
Dibra Street, No. 372,
Tirana, Albania
Tel: +355682064725
monikafida@gmail.com

## 1. Introduction

Trigeminal neuralgia manifests as chronic pain characterized by sharp, shock-like sensations in one or more divisions of the trigeminal nerve. In cases where pharmacotherapy proves ineffective, there is an increasing amount of research indicating that, injections of Botulinum toxin type A (BTX-A) into the trigeminal ganglion offer pain relief lasting from several weeks to several months. We present a case of a patient suffering from Trigeminal Neuralgia, unresponsive to pharmacotherapy, who subsequently underwent treatment with local injections of Botulinum toxin type A (BTX-A).

## 2. Case Report

A 51-year-old female presented with trigeminal neuralgia pain in the region of her right maxillary nerve. She reported a 2-year history of sudden, intense shock-like facial pain, with episodes occurring 5–6 times per day, especially during cold weather or chewing. Recently these symptoms had gotten worse, with attacks of pain that occurred regularly for days to weeks, sometimes several times a day. The diagnosis of Trigeminal Neuralgia (TN) was confirmed by her neurologist, based on the clinical signs and symptoms as well as findings on Magnetic Resonance Imaging (MRI) of the cranium, which showed neurovascular contact of the right trigeminal nerve root entry zone. It is important to note that the MRI was performed 6 months after the onset of symptom exacerbation, helping to correlate imaging with clinical deterioration. The patient declined microvascular decompression due to the associated surgical risks.

She had been treated with anticonvulsants such as carbamazepine (up to 800 mg/day) and gabapentin (up to 1800 mg/day) over several months, but these provided only partial relief, and increasing dosages led to drowsiness, dizziness, and impaired concentration. This was the reason the patient came to our clinic, requesting Botulinum toxin type A (BTX-A) injections for her trigeminal neuralgia pain.

The patient was informed that BTX-A injections for TN was not an FDA-approved procedure, but current literature supports its off-label use. After obtaining informed consent, a treatment plan was initiated. We evaluated the pain intensity with the Visual Analog Scale (VAS) on a score of 9/10. The painful area was mapped according to the patient's symptom description and facial anatomical landmarks (Fig. 1). A total of 100 Units of BTX-A was diluted in 2.5 ml saline. BTX-A was injected intradermally at the sites of pain, guided by pain mapping and anatomical landmarks of the maxillary (V2) distribution (Fig. 1). Each site received 3 Units, chosen based on protocols from prior studies indicating this dose as both safe and effective.

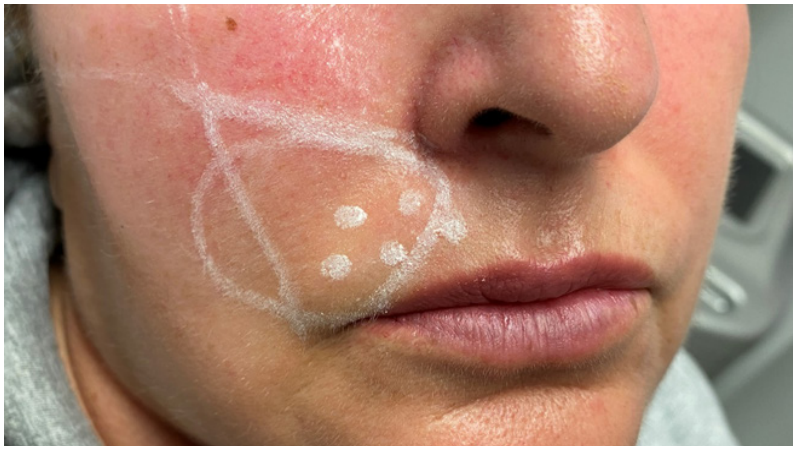

**Fig. 1.** *Distribution of pain in right maxillary (V2) region and corresponding intradermal BTX-A injection sites (marked by patient pain mapping).*

Two weeks after treatment with BTX-A injections, the patient experienced significant pain relief. The Visual Analog Scale (VAS) decreased from 9/10 to 3/10, and pain episode frequency dropped from 5–6 daily attacks to only 1–2 mild episodes per week. This reduction indicates a substantial improvement in the patient's pain management and quality of life. The patient reported fewer episodes of sharp, shock-like pain and was able to resume daily activities with minimal discomfort.

No adverse effects such as muscle weakness, asymmetry, or allergic reactions were observed during follow-up, and the patient expressed interest in repeating the treatment if symptoms returned. She was monitored monthly for 6 months and remained improved for approximately 4.5 months before mild recurrence of symptoms.

## 3. Discussion

Trigeminal Neuralgia (TN) is "a disorder characterized by recurrent unilateral brief electric shock-like pain, abrupt in onset and termination, limited to the distribution of one or more divisions of the trigeminal nerve and triggered by innocuous stimuli", as defined by the International Headache Society (1). Symptoms of pain include sharp, lancinating, shock-like or electric-like attacks that can be sudden, severe, and superficial, as well as tic-like cramps (involuntary contraction of facial muscles) (2). Each pain attack lasts up to two minutes, and most patients remain asymptomatic between attacks. This is considered to be Classical TN, which is purely paroxysmal. A persistent background pain of moderate to severe intensity can also follow pain attacks and this is called Classical TN with concomitant persistent facial pain (1).

TN affects mostly the maxillary (V2) and mandibular (V3) trigeminal branches and less commonly the ophthalmic (V1) branch. According to various studies, it has been demonstrated that the right side of the face is affected more often than the left side of the face by TN. Additionally, it has been found a slight female predominance in TN incidence (3).

Regarding the quality of life, it is negatively affected by TN, with studies showing increased psychological distress, depression and anxiety that sometimes may even result in suicide attempts (4). Pain reduction/relief may improve mood disorders and lead to improved quality of life. Thus, multidisciplinary teams are essential for the effective management of TN.

Pharmacotherapy is the first line of treatment, usually with anticonvulsants and antispasmodics. However, these are frequently associated with side effects and are not effective in all cases. Among the other interventions available are microvascular decompression, gamma knife radiosurgery, or rhizotomies, which each has significant risks and side effects (2, 5).

The injection of Botulinum toxin type A (BTX-A) into the trigeminal ganglion has been shown to be effective for patients with trigeminal neuralgia. BTX-A works primarily by inhibiting acetylcholine release by binding to the presynaptic nerve terminals, thus affecting muscle contraction. Its antinociceptive impact on trigeminal neuralgia is brought about by various mechanisms. The identification of a direct analgesic action implies that BTX might operate through an alternative mode of action (6, 7).

Most theories propose that BTX-A not only inhibits the release of acetylcholine (Ach) but also other neurotransmitters. Blocking the release of these neurotransmitters from nociceptive nerve endings is thought to bring about pain relief. Another potential site for the analgesic effect of BTX-A could be postganglionic sympathetic nerve endings that utilize norepinephrine (NE) and adenosine triphosphate (ATP) as neurotransmitters. With NE elevated in chronic pain and ATP linked to the stimulation of muscle nociceptors, it is theorized that BTX-A might inhibit the release of these neurotransmitters, producing an analgesic effect in cases of sympathetically maintained pain associated with complex regional pain syndrome (8, 9).

However, the relief from pain is temporary, usually persisting for a duration ranging from 6 weeks to 6 months, necessitating patients to undergo recurrent injections for sustained benefits (8).

Wu et al. conducted a randomized, double-blind, placebo-controlled study involving 42 patients with trigeminal neuralgia: 22 received BTX-A treatment, while 20 received a placebo. In this class I study, the intervention group received 75 units of BTX-A injected either intradermally or submucosally into the painful regions of each patient. Among those

who received BTX-A injections, 68.18% reported a reduction of more than 50% in pain intensity on the VAS, in contrast to 15% in the placebo group (10).

Turk et al. undertook a class IV, open-ended study to explore the efficacy of administering BTX-A to individuals with trigeminal neuralgia. Eight patients received 100 units of BTX-A around the zygomatic arch, and all experienced positive effects (11). In another class IV, open-label study, 13 patients with idiopathic trigeminal neuralgia underwent transcutaneous BTX-A injections at the trigeminal nerve branches. Four patients achieved pain relief, and nine reported a reduction of over 50% in pain intensity, measured by the VAS score, which persisted for 60 days (12).

Although the relief from pain typically lasts 6–12 weeks, repeated injections have been reported as safe and effective in various small-scale studies and clinical experiences. In a retrospective analysis of patients receiving BTX-A for hemifacial spasm and blepharospasm—neurological conditions that, like TN, require repeated injections over years—no cumulative systemic toxicity or permanent local tissue damage was observed, even after more than 10 years of regular use. Applied to TN, available reports indicate that repeated BTX-A injections do not significantly increase the risk of muscle atrophy, facial asymmetry, or resistance development, provided that the dosage remains within therapeutic range and injections are correctly localized. Additionally, studies have not demonstrated increased risk of neuromuscular junction disorders or systemic side effects over time (13-15).

Another point of consideration is the limited data on BTX-A use in patients with comorbid neuromuscular disorders, such as myasthenia gravis or Lambert-Eaton syndrome, where even small doses can provoke unwanted effects.

Numerous case reports have shown consistent success with BTX-A injections in treating trigeminal neuralgia. However, long-term data on repeated BTX-A use in TN patients are still limited. Future longitudinal, multicenter studies with larger cohorts and extended follow-up durations are necessary to fully characterize the long-term safety and efficacy profile of BTX-A in the treatment of TN.

## 4. Conclusions

Administering local injections of BTX-A might prove effective and safe for treating trigeminal neuralgia over an extended period, offering a novel strategy for certain patients. This approach could be particularly beneficial for middle-aged and elderly individuals who may struggle with drug side effects and harbor concerns about potential serious complications following microvascular decompression (MVD).

## Abbreviation and acronym list

1. Trigeminal Neuralgia (TN)
2. Magnetic Resonance Imaging (MRI)
3. Botulinum toxin type A (BTX-A)
4. Visual Analog Scale (VAS)
5. Norepinephrine (NE)
6. Adenosine Triphosphate (ATP)
7. Microvascular Decompression (MVD).

**FUNDING**

All authors report no conflict of interest.

**DISCLOSURE**

All authors report no conflict of interest.

**DATA AVAILABILITY STATEMENT**

Data openly available in a public repository that issues datasets with DOIs.

**ETHICS STATEMENT**

The authors obtained written consent from patients for their photographs and medical information to be published in print and online and with the understanding that this information may be publicly available. Patient consent forms were not provided to the journal but are retained by the authors.

## References

1. Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd Edition. Cephalalgia. 2018;38(1):1–211. doi:10.1177/0333102417738202.

2. Araya EI, Guíñez-Molinos S, Carmona-Castro O, Fuentealba-Arévalo E, Chandía-Poblete D. Trigeminal Neuralgia: Basic and Clinical Aspects. Curr Neuropharmacol. 2020;18(2):109-119. doi:10.2174/1570159X17666191010094350.

3. Katusic S, Beard CM, Bergstralh E, Kurland LT. Incidence and clinical features of trigeminal neuralgia, Rochester, Minnesota, 1945–1984. Ann Neurol. 1990;27(1):89–95. doi:10.1002/ana.410270114.

4. Wu TH, Hu LY, Lu T, et al. Risk of psychiatric disorders following trigeminal neuralgia: A nationwide population-based retrospective cohort study. J Headache Pain. 2015;16(1):64. doi:10.1186/s10194-015-0548-y.

5. Tatli M, Satici O, Kanpolat Y, Sindou M. Various surgical modalities for trigeminal neuralgia: Literature study of respective long-term outcomes. Acta Neurochir (Wien). 2008;150(3):243–255. doi:10.1007/s00701-007-1474-y.

6. Klein AW. The therapeutic potential of botulinum toxin. Dermatol Surg. 2004;30(3):452–455. doi:10.1111/j.1524-4725.2004.30096.x.

7. Kroumpouzos G, Kassir M, Gupta M, Patil A, Goldust M. Complications of botulinum toxin A: An update review. J Cosmet Dermatol. 2021;20(6):1585–1590. doi:10.1111/jocd.14160.

8. Mense S. Neurobiological basis for the use of botulinum toxin in pain therapy. J Neurol. 2004;251(Suppl 1):I/1–I/7. doi:10.1007/s00415-004-1101-9.

9. Verma G. Role of Botulinum Toxin Type-A (BTX-A) in the Management of Trigeminal Neuralgia. Pain Res Treat. 2013;2013:831094. doi:10.1155/2013/831094.

10. Wu CJ, Lian YJ, Zheng YK, et al. Botulinum toxin type A for the treatment of trigeminal neuralgias: Results from a randomized, double-blind, placebo-controlled trial. Cephalalgia. 2012;32(6):443–450. doi:10.1177/0333102412441724.

11. Turk U, Ilhan S, Alp R, Sur H. Botulinum toxin and intractable trigeminal neuralgia. Clin Neuropharmacol. 2005;28(4):161–162. doi:10.1097/01.wnf.0000161994.63016.fc.

12. Bach-Rojecky L, Dominis M, Lackovic Z. Lack of anti-inflammatory effects of botulinum toxin A in experimental models of inflammation. Fundam Clin Pharmacol. 2008;22(5):503–509. doi:10.1111/j.1472-8206.2008.00616.x.

13. Dressler D. Clinical applications of botulinum toxin. Curr Opin Microbiol. 2012;15(3):325-336. doi:10.1016/j.mib.2012.05.012.

14. Thouaye M, Yalcin I. Neuropathic pain: From

actual pharmacological treatments to new therapeutic horizons. Pharmacol Ther. 2023;251:108546.

15. Matak I, Lacković Z. Botulinum toxin A, brain and pain. Prog Neurobiol. 2014;119-120:39-59. doi:10.1016/j.pneurobio.2014.06.001.