OPEN ACCESS Freely available online

ISSN: 2161-1122
Dentistry

Mini Review

The Management of Peripheral Painful Traumatic Trigeminal Neuropathy Secondary to Implant Placement Using Topical Medication

Abrar Sabeh*

Department of Neurology, Stanford University, California, United States

ABSTRACT

Introduction: Peripheral painful traumatic trigeminal neuropathy PPTTN is a disabling condition following peripheral nerve trauma (extraction, bone graft, implant placement etc.). Implant neuropathy occurs duo to nerve violation of any of the branches of the 5th cranial nerve during dental implant placement. This article presents an unusual extraoral clinical presentation of this relatively rare condition (dermatomal distribution of a traumatized long buccal nerve) and a unique way to achieve treatment through topical medication.

Literature review: A 40-year-old male presented with "occasional burning pain on his left cheek" following a traumatic surgical extraction followed by bone graft and implant placement, 4 months prior to the orofacial pain clinic visit.

Conclusion: Early treatment following nerve injury is crucial and in this case topical medication alone was successful as a treatment choice for implant neuropathy.

Keywords: Nerve dysfunction; Neuropathy; Peripheral nerve disease; Traumatic neuropathy; Trigeminal nerve disease; Trigeminal neuropathy

INTRODUCTION

Neuropathic pain results from a lesion or disease of the somatosensory system affecting (large myelinated Ab fibers, thin myelinated Ad fibers, unmyelinated C fibers) peripherally or the central neurons centrally [1]. Oral and maxillofacial surgeons and dentists are confronted with neuropathic pain disorders and other complex chronic pain disorders in the orofacial region in routine practice which often becomes a source of confusion to the dentist due to the complex atypical clinical picture of the disease. A few patients present with dental pain without any identifiable dental etiology. Such patients are classified under the category of 'atypical facial pain'. Peripheral Painful Traumatic Trigeminal Neuropathy (PPTTN) is one of these complex chronic pain disorders in the orofacial region that is poorly understood [2]. It was previously referred to as a typical facial pain or a typical odontalgia but the term is no longer used. The terminology: Peripheral Painful Traumatic Trigeminal Neuropathy (PPTTN) was introduced by Dr. Rafael Benoliel, Dr. Junad Khan and Dr. Eli Eliav in 2011. In their article, they reviewed the clinical, pathophysiological and therapeutic aspects of the disease. They also reported that pain is unilateral and may be precisely located to the dermatome of the affected nerve with demonstrable sensory dysfunction, particularly if a major nerve branch has been injured. Hyperalgesia and other sensory changes may be found in extra-trigeminal sites of PTTN patients, suggesting more extensive changes in central somatosensory processing.

Implant neuropathy is an iatrogenic implant related nerve neuropathy resulting from a faulty bone drilling or implant compression technique during implant placement. In literature, implant neuropathy reports relating to (inferior alveolar and lingual) branches of the mandibular division of the trigeminal nerve are relatively frequent, but there are rare reports of such neuropathies in the long buccal branch of the trigeminal nerve, which is the case of our patient [3]. Early treatment following nerve injury (acute neuropathy following implant placement) *vs.* (chronic implant neuropathy) is crucial, typically by removing the

Correspondence to: Abrar Sabeh, Department of Neurology, Stanford University, California, United States; E-mail: abrarmsabeh@gmail.com

Received: 15-Sep-2020, Manuscript No. DCR-24-6497; **Editor assigned:** 18-Sep-2020, PreQC No. DCR-24-6497 (PQ); **Reviewed:** 02-Oct-2020, QC No. DCR-24-6497; **Revised:** 01-Aug-2024, Manuscript No. DCR-24-6497 (R); **Published:** 29-Aug-2024, DOI: 10.35248/2161-1122.23.14.699

Citation: Sabeh A (2024) The Management of Peripheral Painful Traumatic Trigeminal Neuropathy Secondary to Implant Placement Using Topical Medication. J Dentistry. 14:699.

offending implant and prescribing steroids (oral prednisone, 10 milligrams three times per day for seven days). Anti-inflammatory analgesic could be prescribed if additional pain control is needed. Although in our case intervention was delayed duo to the fact that the patient presented to the OFP clinic 4 month following the nerve injury, we were lucky in eliminating the pain completely. Management of such cases is always a key and duo the systemic adverse effects topicals are preferred over systemic medications as a first line of treatment which in our case proven to be successful in eliminating the pain completely and demonstrated to be the treatment choice for implant neuropathy [4].

LITERATURE REVIEW

A 40-year-old Caucasian male presented to the orof acial pain clinic with a chief complaint of "occasional burning pain on his left cheek over the past few months". Onset started 4 months ago (prior to the orofacial pain clinic visit) following a traumatic surgical extraction, bone graft and implant placement on teeth #18 and 19. Pain extended extra-orally from the facial midline to the left angle of the mandible, along the dermatomal distribution of the long buccal nerve opposite to the traumatized teeth areas (opposite to tooth #18 and 19) with an intensity of 3 to 4 out of 10 in severity on Visual Analog Scale (VAS). Episodes of burning pain usually lasting for 3 to 4 hours with constant background dysesthesia and numbness. Pain was intermittent in frequency approximately once or twice a day and triggered by cold air, stress and anger [5]. Patient previously sought neurological consultation from a neurologist who performed Magnetic Resonance Imaging (MRI) of the brain and ruled out pathology of the trigeminal nerve root (neurovascular compression) or intracranial lesion of any kind. He was prescribed neurobionics (Vitamin B complex) 2 tabs/day and reported improvement of symptoms but it did not alleviate the entire pain [6]. Review of systems revealed that the patient was healthy overall non-significant for any pathology. On examination, the patient had a blood pressure of 125/80 mm Hg and a pulse rate of 73/min. He had no known drug allergies. OPG shows root canal treated #2, 3, 5, 12, 20, 28, 29, 30, 31 and zirconia crowns on #2, 3, 5, 12, 15, 20, 28, 29, 30, 31. Patient reported a history of bad oral hygiene in the past. Cranial nerve screening examination revealed hyperesthesia in the left mandibular branch of the trigeminal nerve V3, during large fibers testing with Q tip (A-delta) [7]. Peripheral Painful Traumatic Trigeminal Neuropathy (PPTTN) diagnosis was reached by the history (onset, location, duration etc.) that was consistent with PPTTN, the clinical examination of the trigeminal nerve and confirmed by the diagnostic tests. The cause seemed to be due to localized trauma to the trigeminal nerve (the long buccal branch) during a dental procedure (extraction and/or graft placement followed by implant) on the area of tooth #18 and 19 with autonomic component (sympathetically maintained pain). Typically for treating a patient with PPTTN, centrally acting medications like Tricyclic Anti-depressants (TCA) E.g. amitriptyline 10 mg is considered to be the 1st drug of choice as it can produce analgesia and a significant relief of symptoms. For neuropathic pain conditions with sympathetic involvement, blockade of α adrenergic receptors will provide a significant relief of pain. In our case, the patient had concerns regarding the side effects of TCAs (weight gain) and refused the systemic medication, therefore only topical medication was prescribed [8]. Topical application of a compound drugs to treat chronic pain conditions in the orofacial rejoin has been proposed comprising of analgesic, anti-anxiety agent, NMDA receptors antagonists and NSAID and α2 agonists was used. It consisted of combination of xylocaine (lidocaine), ketoprofen (orudis), ketamine (ketalar), gabapentin (neurontin), carbamazepine (tegretol), capsaicin (capsagel) to be applied twice daily. Topical application of that drug was effective in alleviating the symptoms. On follow up one month after the initial visit and another follow-up 6 months after the initial visit, pain was successfully eliminated 0 out of 10 on a VAS scale. No further treatment was required.

DISCUSSION

Persistent and chronic orofacial pain is common in the head and neck region and dentists are more likely to encounter these rather complex cases in their practices [9]. According to the international association for the study of pain, atypical odontalgia (the former terminology of the disease) is defined as a "severe throbbing pain in the tooth without major pathology" and "persistent (chronic) continuous pain symptom located in the dento-alveolar region and cannot be explained within the context of other diseases or disorders." According to the international headache classification, it is thought to be a subtype of persistent idiopathic facial pain and is defined as persistent facial and/or oral pain, with varying presentations but recurring daily for more than 2 hours per day over more than 3 months, in the absence of a clinical neurological deficit [10]. Recently, it has been reported that there is involvement of peripheral and central sensitization of the trigeminal pathways of the condition as well as a relationship between chronic pain and central sensitization. As for treatment, the effectiveness of antidepressants such as amitriptyline has been reported. Antidepressants activate serotonin and noradrenaline in the nervous system and affect the descending pain inhibitory system of the neurotransmission pathway. However, not all patients respond adequately to antidepressants. Topical applications such as capsaicin have been used in the management of neuropathic pain conditions with varying degree of success. It decreases pain by depleting substance P in C-fiber primary afferents thereby reducing peripheral noxious input to already sensitized central second-order neurons [11].

In the management of PPTTN, topical medications (analgesic, anti-anxiety agent, NMDA receptors antagonists, NSAID and α2 agonists) have been formulated and combined with orabase to form an ointment and placed under a neurosensory shield to be applied a few times a day for 5-10 minutes for several weeks. Initially most patients will complain of a burning sensation that will wear off within 1-2 days. Combining these topical medications with a local anesthetic may reduce this initial discomfort. To achieve maximum benefit, it is important to apply it in a consistently. Many other agents have been formulated for topical use including ketoprofen (orudis) an nsaid, xylocaine (lidocaine), ketamine (ketalar) an NMDA

receptor antagonist, capsaicin (capsagel) which encourages the release of substance P, inhibiting its biosynthesis and axonal transport leading to a depletion of substance P in the central and peripheral nervous system. These agents are frequently used in combination in a Pluronic Lecithin Organogel (PLO) gel. Pain was eliminated in our patient using these combined topical medications [12].

CONCLUSION

The presentation of PPTTN in our patient was unusual in terms of its location (long buccal branch of the trigeminal nerve is rare compared to IAN and lingual nerve implant neuropathy). Topical applications of a compound medication were successful in complete pain elimination of implant neuropathy.

REFERENCES

1. Crandall JA. An Introduction to orofacial pain. Dent Clin North Am. 2018;62(4):511-523.
2. Knapik JJ, Marshall SW, Lee RB, Darakjy SS, Jones SB, Mitchener TA, et al. Mouthguards in sport activities: History, physical properties and injury prevention effectiveness. Sports Med. 2007;37(2):117-144.
3. Benoliel R, Gaul C. Persistent idiopathic facial pain. Cephalalgia. 2017;37(7):680-691.
4. Benoliel R, Kahn J, Eliav E. Peripheral painful traumatic trigeminal neuropathies. Oral Dis. 2012;18(4):317-332.
5. Benoliel R, Teich S, Eliav E. Painful traumatic trigeminal neuropathy. Oral Maxillofac Surg Clin North Am. 2016;28(3):371-380.
6. Kohli D, Katzmann G, Benoliel R, Korczeniewska OA. Diagnosis and management of persistent posttraumatic trigeminal neuropathic pain secondary to implant therapy: A review. J Am Dent Assoc. 2021;152(6):483-490.
7. Sharav Y, Heiliczer S, Benoliel R, Haviv Y. Pharmacological topical therapy for intra-oral post traumatic trigeminal neuropathic pain: A comprehensive review. Pharmaceuticals. 2024;17(2):264.
8. Conti PC, Bonjardim LR, Stuginski-Barbosa J, Costa YM, Svensson P. Pain complications of oral implants: Is that an issue. J Oral Rehabil. 2021;48(2):195-206.
9. Johnson MD, Burchiel KJ. Peripheral stimulation for treatment of trigeminal postherpetic neuralgia and trigeminal posttraumatic neuropathic pain: A pilot study. Neurosurgery. 2004;55(1):135-142.
10. Takenoshita M, Miura A, Shinohara Y, Mikuzuki R, Sugawara S, Tu TT, et al. Clinical features of atypical odontalgia; three cases and literature reviews. Biopsychosoc Med. 2017;11:21.
11. Arnold M. Headache classification committee of the International Headache Society (IHS) the international classification of headache disorders. Cephalalgia. 2018;38(1):1-211.
12. Reale R, Slater G, Burke LM. Individualised dietary strategies for olympic combat sports: Acute weight loss, recovery and competition nutrition. Eur J Sport Sci. 2017;17(6):727-740.