Journal of Dentistry and Oral Sciences

ISSN: 2582-3736
Zuba LP, et al., 2023-J Dent Oral Sci
Review Article

Treatments For Painful Post-Traumatic Trigeminal Neuropathy: A Literature Review and Clinical Case Report

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Receiving Date: 01-08-2023

Accepted Date: 11-08-2023

Published Date: 25-08-2023

Abstract

Trigeminal neuralgia (NT), also known as Fortherghill's disease or Prosopalgia Dolorosa (LEITÃO & FIGUEIRÊDO, 1985), is a disease mainly affected by middle-aged women, characterized by paroxysms of pain, shock and burning. During an episode of pain, the muscles of the face go into a state of intense contraction. Treatments range from laser therapy, electro acupuncture, use of anticonvulsants to surgeries, indicated for patients with failed pharmacological therapy (30%) and those who had a good initial response but became refractory to treatment over time. The percutaneous procedures most used today are radiofrequency thermocoagulation, glycerol rhizolysis (MENESES et al., 1994) and balloon decompression (HOLZER et al., 1992). The objective of this work is to refer to the different types of treatments for the disease, through a literature review and a clinical case report.

Keywords: Treatments; Neuralgia; Ache; Trigeminal nerve

Introduction

The trigeminal nerve is the fifth pair of 12 cranial nerves, having two roots, one motor and one sensory. It originates from the pons and leaves the skull through the foramen ovale. The sensory root has fibers classified as general somatic afferents and are responsible for conducting general sensitivity and exteroceptive impulses (touch, pain, temperature) from the skin and mucosa of the face, teeth, anterior 2/3 of the tongue and cranial dura mater [1].

Trigeminal neuralgia (TN) is a chronic unilateral condition activated by the muscles of mastication and the face during speech, swallowing and mouthwash that produce sensations of heat, burning, stabbing or electric shock superficially to the affected nerve area, which start abruptly for a few seconds or minutes and may be repeated in short intervals of time, producing prolonged paroxysms (moment of greater pain intensity).

The conjunction of the degenerative processes of aging associated with vascular compression (usually arteries) acting, for years, on the posterior (sensitive) root of the trigeminal nerve, in the pons, trigger episodes of neuralgia. Mechanical compression of the blood vessel or direct injury to the nerve during implant insertion can cause a neural degenerative process, generating short circuits by neuronal demyelination or affect the microcirculation causing local hematoma that work by exchanging the interpretation of the original touch impulses for pain, triggering trigeminal neuralgia [2]. The present clinical case aims to illustrate the Trigeminal Neuralgia that generated a persistent post-surgical pain, with evolution of 6 months, originated in the act of insertion of the implant in the jaw region.

Literature Review Pharmacological Treatments

They are considered first-line treatments because they are not invasive, in addition to presenting a good therapeutic response in most cases [3]. The main drugs used are anticonvulsants, but other modalities can be used such as opioids, antidepressants, muscle relaxants and analgesics [4].

Carbamazepine

It works by blocking sodium channels in neuron membranes, inhibiting the excitatory function of most channels. The drug also potentiates the action of GABA, a physiological neurotransmitter that inhibits the generation of action potentials [5]. Dosage should begin with doses of 100 mg/day consumed every 8 hours, with gradual increase in doses every two or three days, reaching 1,600 mg/day, observing clinical effects and tolerability. If pain is controlled, doses may decrease [6]. Maintenance doses can be administered and range from 300 to 800 mg/day, divided into two to three daily doses. Effectiveness is approximately 80% initially. Over time, higher doses may be necessary to maintain efficacy, which decreases in approximately 50% of patients due to carbamazepine self-induction [7].

Oxcarbamazepine

Oxcarbazepine is an alternative to carbamazepine in the same way that it has the same inhibitory action on sodium channels, in addition to having a higher level of tolerability and more attractive pharmacokinetic interactions [8]. Regarding the oxcarbazepine dosage, it can be started with 150 mg twice a day. The dose may be increased as tolerated and increased by 300 mg every three days until pain relief

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DOI: https://doi.org/10.37191/Mapsci-2582-3736-5(2)-153

occurs. Maintenance doses range from 300-600 mg twice daily, with the maximum suggested dose being 1800 mg daily.

Lamotrigine

It has a similar mechanism of action to carbamazepine, in addition to interacting with sodium channels, the drug has several additional mechanisms such as the inhibition of N-type and P-type high-voltage activated calcium channels and the increase in potassium repolarization currents, these interactions may account for the differential effect of lamotrigine on status epilepticus compared to other drugs. [9] Starting doses of lamotrigine is 25 mg twice daily and can be gradually increased to a maintenance dose of 200-400 mg/d in 2 divided doses. The dosage required for adequate pain relief ranges from 100 to 400 mg/d [10].

Baclofene

A drug that initially promotes muscle pain relief because it is an agonist of the GABA B receptor and, therefore, depresses excitatory neurotransmission, is recognized to have beneficial effects in cases of trigeminal neuralgia due to its relaxing effect on skeletal muscle fibers [11]. The initial dose is 10 mg / d for 3 days, which can be increased to 10-20 / d every 3 days if necessary, the maximum tolerated dose is 60-80 mg / d, given 3-4 times a day.

Gabapentin

Administered orally, its mechanism of action differs from that of phenytoin and carbamazepine, acting on presynaptic calcium channels in neurons to inhibit the release of excitatory neurotransmitters. It has been shown to be effective in the treatment of NT at a dose of 300mg per day, with the possibility of increasing the dose to a maximum of 3.6 grams (3,600mg) per day. [12].

Pregabalin

Oral use. It has a higher cost than gabapentin, but it is considered more effective because it achieves the analgesic effect in a shorter time. It acts on calcium channels by reducing the release of excitatory neurotransmitters such as glutamate at synapses [13]. One study proved its effectiveness in reducing TN pain in more than 50-74% of patients. 150mg to 600mg per day can be given.

Topiramate

Oral use. considered effective in 75% of patients in a study of 8 patients with classic TN [14]. It acts by blocking sodium channels and inhibiting the release of excitatory mediators by acting on calcium channels. It can be administered to adults and children over 10 years of age in doses of 400 mg daily. It is recommended to start with 25 to 50 mg/day, increasing this dose weekly. It is also effective in preventing migraines [15].

Botulinum Toxin Type A (Btx-A)

In addition to its aesthetic purpose, it can be used as a form of treatment for neuromuscular diseases. Injectable form of administration in the pericranial muscles. Its mechanism of action is by inhibiting the release of acetylcholine from the cholinergic nerve endings of motor nerves. It inhibits the release of glutamate, substance P and calcitonin [16]. It can inhibit neurogenic inflammation and peripheral sensitization and may act as an analgesic. It proved to be safe and efficient in the treatment of refractory TN, with a reduction of at least 50% in the frequency and intensity of painful episodes after treatment with BTX-A, in a period of 2 to 4 months [17].

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Alcoholic Injection

technique in which a solution of absolute alcohol must be precisely infiltrated in milliliters in the region close to the trigeminal nerve [18]. Despite providing momentary relief, the technique has certain limitations as it provides pain relief only for a limited period that can last for days or months, and that repeated infiltrations are less successful and increase the chances of complications later [19].

Surgical Treatments

Surgical procedures are indicated as a second alternative if pharmacological therapy proves to be ineffective. Many procedures are proposed according to the profile of each patient, such as Microvascular Decompression, Neurectomy, trigeminal percutanea rhizotomy by radiofrequency , percutanea rhizolysis by glycerol and percutana microcompression by balloon [20-44].

Clinical Case Report

Female patient, HMBC, 58 years old, feoderma, underwent extraction surgery of elements 35, 43, 44 and immediate installation of 5 implants of immediate loading in the mandible region, on April 23, 2018. Shortly after the procedure, the patient complained of intense pain in the left lower alveolar ridge region. With the pain and paresthesia persisting, in May of the same year the patient underwent a new CT scan and a second dental surgeon who was consulted requested the removal of the implant in the region of tooth 35, as it was compressing the loop. anterior to the mental nerve. Pregabalin 75mg, Tegretol 200mg, Toragesic 10mg, Bismu-Jet 20ml and vitamin B 12 were prescribed for symptom relief. after two months, the implant that was causing pain was removed. The patient resorted to laser therapy and electroacupuncture procedures, started in June 2018 to 2019, performed by professors of dentistry at UFMG for about 1 year, interrupted due to COVID-19. He performed 20 ozone therapy sessions without obtaining significant results.

In May 2020, in consultation with a specialist in Rio de Janeiro, he started treatment with an orthopedic device, reporting a slight improvement in pain when using it. Finally, the patient performed a session of injection of 99.5% absolute alcohol in the trigger point region of the mental foramen, also without obtaining significant results. As a last treatment option, the patient underwent a neurectomy surgery of the inferior alveolar nerve branch that interrupts the nerve connection, ceasing the pain and sensation of hyperesthesia.

Discussion

The pain described by the patient was of the throbbing type, with a tingling and burning sensation that radiated unilaterally through the left side of the mandible and made it impossible for her to communicate or eat. The prolonged compression of the implant superimposed on the inferior alveolar nerve generated traumas that began with paresthesia of the jaw region, evolving to hyperesthesia with the exacerbation of the pain, generating partial nerve injury - axonotmesis - and, finally, its complete neurotmesis. The ineffectiveness of non-invasive treatments makes intervention by surgical means necessary. The surgery of choice for the case was mental nerve neurectomy, which consists of the complete exposure of the neural sheath and resection of the inferior alveolar neurovascular plexus, interrupting the nerve connection,

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ceasing the pain and sensation of hyperesthesia. The neurectomy surgery was significant in improving the patient's clinical condition, providing relief from painful symptoms and improvement in quality of life, compared to previous treatments that did not show relevant results.

Conclusion

It can be concluded that there are several types of treatments for trigeminal neuralgia, but it is not always possible to achieve success by non-invasive means, requiring surgical intervention to section the branch of the trigeminal nerve.

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