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Case Report

Prolotherapy in the treatment of chronic migraine — Case report

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Abstract

Introduction
Chronic migraine is a socioeconomic and individual burden since it is the largest cause of disability in people under 50 years of age. Although there are several prophylactic drug alternatives, some patients are vulnerable to refractoriness with significant damage to their quality of life. Prolotherapy, a subcutaneous injection of dextrose in peripheral nerves, advocates as a promising tool in the management of this pathology.

Case report
A patient with refractory chronic migraine to drug therapy who was submitted to neurofascial prolotherapy. Weekly administration of a 2 ml solution of 1% ropivacaine and 10% glucose in the head peripheral nerves for 6 weeks. Reduced disability and frequency of migraine attacks for a period of 8 weeks after interventions.

Conclusion
Prolotherapy proved itself to be a notable technique for reducing the number of days in a month that a patient with refractory chronic migraine to standardized therapy has had headaches. However, placebo group studies are needed to determine the efficacy of the procedure.

Keywords:
Prolotherapy
Chronic migraine
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Treatment

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Introduction

Chronic migraine is the largest cause of disability in people under 50 years of age and, as a result, represents a socioeconomic burden.[1] In Brazil, it is the second most frequent non-communicable disease and the most disabling, since it crosses the individual, social and professional life spheres of the affected.[2-5] Therefore, it is important to seek useful therapeutic strategies to avoid recurrence and impairments linked to migraine attacks when conventional prophylactic treatment does not generate good results.

In different degrees of evidence, the drug groups used in chronic migraine prophylaxis involve antidepressants, antiepileptics, antihypertensives and calcitonin gene-related peptide (CGRP) antagonists. As for the minimally invasive intervention, there are prolotherapy and botulinum toxin type A.[6] Neurofascial prolotherapy is a technique developed by Lyftogt that consists of the perineural injection of 5% dextrose diluted in sterile water into subcutaneous nerves[7] and has proved to be a promising option for the treatment of chronic migraine, when admitted that this condition comes from an introduced sensitization of pain pathways into the central nervous system.[8] While dextrose acts with significant long-term analgesic and anti-inflammatory potential, the local anesthetic, ropivacaine, can alter the activity of pain pathways, blocking them instantly.[7] This can ensure better adherence of the patient to treatment due to the less traumatic pain experience after the procedure.

The objective of this study is to report the case of a patient with refractory chronic migraine to drug therapy who was submitted to prolotherapy in a pain-specialized center.

Case report

A 25-year-old woman presents a history of persistent and disabling headache for 3 years. Constant and daily headache attacks with severe intensity and the presence of nausea, vomiting, photophobia and phonophobia. Without aura. Signs of pain worsening during physical activities. Reports previous use of venlafaxine (300 mg/day), topiramate (200 mg/day), and chlorpromazine, as well as frequent use of anti-inflammatory agents, corticosteroids, and triptans. Even during optimized drug therapy, intense pain remained. Neurological examination showed no focal alterations and unaltered neuroimaging. Patient without previous comorbidities. The patient was submitted to an anesthetic scalp block with serial ropivacaine and glucose for six consecutive weeks. In this period, a standardized application of a 2 ml solution composed of 1% ropivacaine and 10% glucose was performed, distributed in the points listed in Figure 1. The improvement of the general pain, with control of migraine attacks and improvement of disability was reported by the patient over the course of 8 weeks. In the follow-up appointment, the patient maintained control of symptoms and did not present complications due to the procedure.

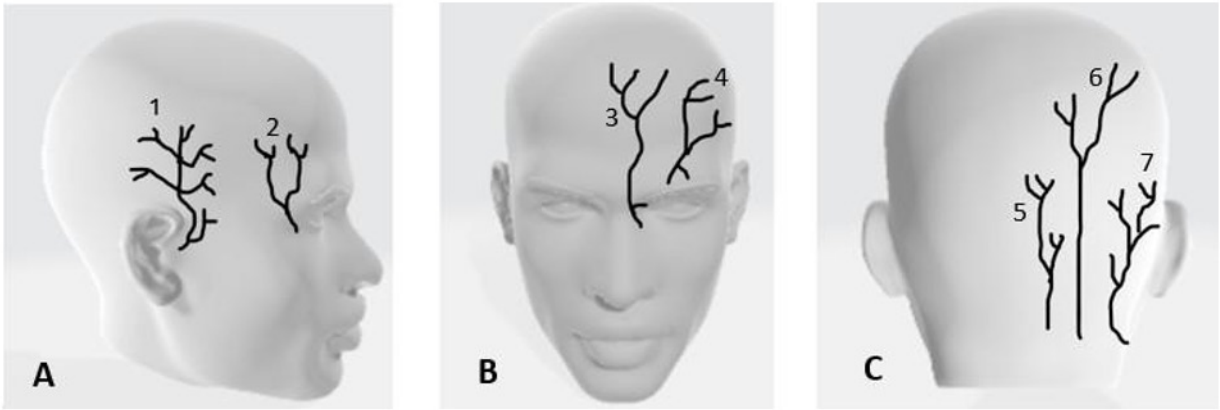

Figure 1. Anatomical topography of the nerve block. A. (1) Auriculotemporal nerve and (2) zygomatic nerve; B. (3) Supratrochlear nerve and (4) supraorbital nerve; C. (5) Third occipital nerve, (6) greater occipital nerve (GON) and (7) lesser occipital nerve.

Discussion

Although little elucidated, evidence points to a self-propagating wave of neuronal and glial depolarization in the cerebral cortex that triggers a prolonged trigeminal nociceptive activation, responsible for establishing a sterile meningeal inflammation that determines migraine pain.[8,9,10] This neurogenic inflammation releases a series of important peptides for the prolongation and intensification of migraine[11,12,] among which stands out the operation of inflammatory mediators as agonists of the transient receptor potential vanilloid subtype 1 (TRPV1), substance P and CGRP.[13,14,15]

Prolotherapy is a minimally invasive application procedure of a solution composed of 5% dextrose and sterile water in subcutaneous nerves[6], whose principle is the blocking effect of dextrose on the capsaicin TRPV1 receptor that establishes a sensorineural inflammatory cascade responsible for pain when activated.[13,16,17] Regarding this mediator, the study by Simone et al.[18] detected a logic between the capsaicin TRPV1 agonism and hyperalgesic response to mechanical stimuli and heat.[14] When activated, this receptor transmits a sensory stimulus through calcium and sodium influx, translated into the brain as a burning, stinging or itching sensation.

This suggests that the TRPV1 antagonism made by dextrose neural prolotherapy can, at least in part, act by obliterating the inflammatory storm in the functional mechanism of migraine. This may be the reason why the improvement of the pain and associated symptoms in the reported patient submitted to neurofascial prolotherapy could be noticed. This understanding is particularly important because it outlines new roadmaps in migraine management, especially in cases resistant to the standardized approach, such as this one.

In addition, ropivacaine is a long-acting local anesthetic with less toxic potential than other equivalent anesthetic solutions, which demonstrates its efficacy and safety for anesthesia and analgesia in peripheral nerve block, both in single application and in continuous peripheral blocks. When combined with dextrose, it produces a long-term analgesic response in a short time, providing the patient with an instantaneous analgesic experience after the procedure.[19]

The main limitation of this report is the impossibility of assigning an evident cause value to the proposed intervention, since there was no review of the intervention by control group, nor collected and analyzed longitudinal variables (such as dietary or physical activity modifications).

Conclusion

Prolotherapy proved itself to be a promising adjunct for the treatment and control of migraine attacks. A minimally invasive option for the control of refractory pain to conventional treatments. Applying this technique to the treatment of migraine, we obtained excellent results in pain control. It is noteworthy that the effective technique depends on an operator with experience and vast knowledge of the procedure, anatomy and medical history of the patient, since the indication comes from resistance to traditional methods.

The dissemination of the technique through documentation and publications on the application mechanism and the obtained results promotes the expansion and improvement of access to new treatment methods for headache. Thus, the evolution of prolotherapy allows new patients to be able to return to daily activities, without impairment or disabilities caused by chronic pain. Finally, more research with placebo group evaluations is necessary to expand the indications and improve the therapeutic regimens, to favor individuals with similar clinical conditions.

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References

1. Steiner TJ, Stovner LJ, Vos T, Jensen R and Katsarava Z. *The Journal of Headache and Pain* 2018; 19(1):10 Doi:10.1186/s10194-018-0846-2
2. Malta DC, Bernal RTI, Lima MG, Araújo SSC, Silva MMA, Freitas MIF and Barros MBA. **Noncommunicable diseases and the use of health services: analysis of the National Health Survey in Brazil**. *Revista de Saúde Pública* 2017; 51(suppl 1): Doi:10.1590/s1518-8787.2017051000090
3. Malta DC, Stopa SR, Szwarcwald CL, Gomes NL, Silva Júnior JB and Reis AAC. **A vigilância e o monitoramento das principais doenças crônicas não transmissíveis no Brasil - Pesquisa Nacional de Saúde, 2013**. *Revista Brasileira de Epidemiologia* 2015; 18(suppl 2): 3-16 Doi:10.1590/1980-5497201500060002
4. Peres MFP, Oliveira AB, Sarmento EM, Rocha-Filho PS, Peixoto PM, Kowacs F, . . . Bensenor IJ. **Public policies in headache disorders: needs and possibilities.** *Arquivos de Neuro-Psiquiatria* 2020; 78(1): 50-52 Doi:10.1590/0004-282x20190144
5. Peres MFP, Queiroz LP, Rocha-Filho PS, Sarmento EM, Katsarava Z and Steiner TJ. **Migraine: a major debilitating chronic non-communicable disease in Brazil, evidence from two national surveys**. *The Journal of Headache and Pain* 2019; 20(1):85 Doi:10.1186/s10194-019-1036-6
6. Hovaguimian A and Roth J. **Management of chronic migraine.** *Bmj* 2022; e067670 Doi:10.1136/bmj-2021-067670
7. Lyftogt J **What is Lyftogt Perineural Injection Treatment? Lyftogtmed**; 2016 [update cited 2023 June 12]. Available from: https://www.lyftogtmed.com/about#research.
8. Bolay H, Reuter U, Dunn AK, Huang Z, Boas DA and Moskowitz MA. **Intrinsic brain activity triggers trigeminal meningeal afferents in a migraine model.** *Nature Medicine* 2002; 8(2): 136-142 Doi:10.1038/nm0202-136
9. Moskowitz MA, Nozaki K and Kraig RP. **Neocortical spreading depression provokes the expression of c-fos protein-like immunoreactivity within trigeminal nucleus caudalis via trigeminovascular mechanisms.** *The Journal of Neuroscience* 1993; 13(3): 1167-1177 Doi:10.1523/jneurosci.13-03-01167.1993
10. Karatas H, Erdener SE, Gursoy-Ozdemir Y, Lule S, Eren-Koçak E, Sen ZD and Dalkara T. **Spreading Depression Triggers Headache by Activating Neuronal Panx1 Channels**. *Science* 2013; 339(6123): 1092-1095 Doi:10.1126/science.1231897
11. Goadsby PJ, Edvinsson L and Ekman R. **Release of vasoactive peptides in the extracerebral circulation of humans and the cat during activation of the trigeminovascular system.** *Annals of Neurology* 1988; 23(2): 193-196 Doi:10.1002/ana.410230214
12. Sarchielli P, Alberti A, Floridi A and Gallai V. **Levels of nerve growth factor in cerebrospinal fluid of chronic daily headache patients.** *Neurology* 2001; 57(1): 132-134 Doi:10.1212/wnl.57.1.132
13. Geppetti P, Nassini R, Materazzi S and Benemei S. **The concept of neurogenic inflammation.** *BJU International* 2008; 101(s3): 2-6 Doi:10.1111/j.1464-410X.2008.07493.x
14. Simone DA, Ngeow JYF, Putterman GJ and LaMotte RH. **Hyperalgesia to heat after intradermal injection of capsaicin**. *Brain Research* 1987; 418(1): 201-203 Doi:10.1016/0006-8993(87)90982-6
15. Jancsó N, Jancsó-GáBor A and Szolcsányi J. **Direct Evidence for Neurogenic Inflammation and Its Prevention by Denervation and by Pretreatment with Capsaicin**. *British Journal of Pharmacology and Chemotherapy* 1967; 31(1): 138-151 Doi:10.1111/j.1476-5381.1967.tb01984.x
16. Weglein AD. **Neural Prolotherapy**. *Journal of Prolotherapy* 2001; 3(2): 639-643
17. Eileen Conaway BB **Neural Prolotherapy for Neuralgia: Journal of Prolotherapy**; 2014 [update cited 2023 June 12]. Available from: https://journalofprolotherapy.com/neural-prolotherapy-neuralgia/.
18. Anand P and Bley K. T**opical capsaicin for pain management: therapeutic potential and mechanisms of action of the new high-concentration capsaicin 8% patch**. *Br J Anaesth* 2011; 107(4): 490-502 Doi:10.1093/bja/aer260
19. Lim HJ, Hasan MS, Chinna K. **Faster onset time of supraclavicular brachial plexus block using local anesthetic diluted with dextrose**. *Rev Bras Anestesiol*. 2016; 66(4):341-345 Doi: 10.1016/j.bjan.2016.04.006