

Topical anesthetic to release trigger points in painful myofascial syndrome. Pilot study

Anestésico tópico para liberação de pontos-gatilhos em síndrome dolorosa miofascial. Estudo piloto

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DOI 10.5935/2595-0118.20180028

ABSTRACT

BACKGROUND AND OBJECTIVES: The myofascial syndrome is a painful regional disorder that is characterized by the presence of painful points that cause referred pain in other sites different from the one of origin, known as trigger points. The use of topical anesthetic associated with acupressure to release trigger points helps to alleviate pain during the myofascial release. The objective of this study was to calibrate instruments to evaluate the topical anesthetic action of lidocaine in active myofascial trigger points during the myofascial release procedure.

METHODS: Pilot, prospective study, tied with the Professional Master's Degree in Health Applied Sciences of the University of Vale do Sapucaí, Pouso Alegre, MG, conducted with the purpose to evaluate the analgesic effect of lidocaine in concentrations of 2, 4 and 7% after 3, 5 and 10 minutes of the application in patients with painful myofascial syndrome.

RESULTS: The descriptive statistics analysis showed a painful response in all lidocaine concentrations related to the evaluated times, except for 7% of lidocaine 10 minutes after the application.

CONCLUSION: The myofascial release was more efficient using lidocaine at 7%, with a ten-minute interval for the anesthetic effect to start the physiotherapy intervention.

Keywords: Anesthetics, Local anesthesia, Lidocaine, Myofascial pain syndromes, Trigger points.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A síndrome miofascial é uma desordem dolorosa regional que se caracteriza pela presença de pontos dolorosos, que provocam dor referida em outros locais diferentes do de origem, conhecidos como pontos-gatilho. A utilização de anestésico tópico associado a dígito-pressão na liberação de pontos-gatilho, tem a finalidade de aliviar a dor durante o procedimento de liberação miofascial. O objetivo deste estudo foi calibrar instrumentos para a avaliação da ação anestésica tópica de lidocaína em pontos-gatilhos miofasciais ativos, durante o procedimento de liberação miofascial.

MÉTODOS: Estudo piloto prospectivo, vinculado ao Mestrado Profissional em Ciências Aplicadas à Saúde da Universidade do Vale do Sapucaí, Pouso Alegre, MG, realizado com a finalidade de avaliar o efeito analgésico do uso de lidocaína em concentrações de 2, 4 e 7% após 3, 5 e 10 minutos da aplicação em pacientes com síndrome dolorosa miofascial.

RESULTADOS: A análise estatística descritiva demonstrou que houve resposta dolorosa em todas as concentrações da lidocaína relacionadas aos tempos avaliados, exceto para 7% de lidocaína após 10 minutos da aplicação.

CONCLUSÃO: A liberação miofascial foi mais eficiente utilizando a lidocaína a 7%, com intervalo de efeito do anestésico para realização da intervenção fisioterápica de 10 minutos.

Descritores: Anestesia local, Anestésicos, Lidocaína, Pontos-gatilho, Síndromes da dor miofascial.

INTRODUCTION

Myofascial pain syndrome (MPS) is one of the most common causes of musculoskeletal pain, affecting the muscles, connective tissue and fascia, especially in the cervical region. Compromising 21 to 90% of people with regional pain complaints, MPS may occur isolated or associated with multiple factors, thus making it hard to diagnose and treat¹⁻³.

Clinically, MPS manifests itself with some key components, including trigger point (TP), segmental muscle spasm, referred pain and involvement of soft tissues, with variable degrees of pain^{2,4}. In the patient with MPS, the diagnosis is performed through medical history and physical examination, mainly palpation of the TPs⁵. When the diagnosis is determined, the type of treatment to be used for MPS should be chosen to aim at the elimination of the TP, recovery of range of motion and muscle strength^{6,7}.

Tps are clinically manifested as discrete nodules, hardened and painful, whose pathogenesis is not well defined yet. However, it

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Submitted in March 29, 2017.

Accepted for publication in March 23, 2018.

Conflict of interests: none – Sponsoring sources: none.

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is believed that this phenomenon is due to the enclosure of nerve endings in muscular fibers, onsetting the sensitization. Due to its high sensitivity to digital pressure, patients with TP manifest motor breakout, called stress signs, or referred pain in close locations^{4,5,8,9}.

Several treatments are used with the purpose of recovering the quality of life of the patient with MPS. The release of the muscle and the fascia, performed through manual pressure on the TP, is the most effective treatment, but it causes a discomfort sensation and pain while being performed. Reduction of pain on the active TP may happen by producing an anesthetic coating around the painful area to be treated^{1,2,10,11}.

There are different types of anesthetics with different basis that can be applied on superficial tissues for pain-associated treatment. Lidocaine has proven its efficacy in MPS in the form of a patch, adhered to the cutaneous region of the TP; however, its effect is on the long-term, preventing its use in the therapeutic practice at the time of the intervention^{2,12-15}.

The literature presents numerous papers on MPS, but there are no approaches regarding topical anesthetic application techniques to prevent the pain caused by diagnosis procedures, and/or MPS treatment during the manipulation of the TP. Therefore, the proposal of the present study is to evaluate the most effective concentration and time range for the topical analgesic action of lidocaine used on taut bands region over active TPs during the myofascial release procedure.

METHODS

A prospective pilot study held with the purpose of calibrating instruments for posterior study with a larger sample, linked to the Master's degree in Applied Health Sciences of *Universidade do Vale do Sapucaí*, a university in Pouso Alegre, MG.

The sample calculation was performed using the Gpower software, version 3.1.9.2 (University of Dusseldorf, Germany) establishing a total of 5 patients for the preliminary analysis. The sample was formed by healthy volunteer patients, non-pregnant, with ages from 30 to 65 years old, both genders, with no restriction regarding ethnicity, education and social class, with no hypersensitivity to topical anesthetics. Patients who accepted to participate in the research signed the Free and Informed Consent Form (FICT).

Volunteers were evaluated by the researcher in individual visits. The first procedure performed was the diagnosis, TP location and mapping, according to TP evaluation criteria established in the literature^{4,5,8,9}. The evaluated area was stabilized through the placement of the duly calibrated hand of the operator on the patient, in a painless place close to the TP. Muscle palpation was performed to locate the taut band with the purpose of finding the most sensitive area, thus selecting muscular fibers in which the TP indicates pain in the affected area. The TP was pressured, and the patient questioned about the presence of pain. Then, the TP was mapped using a ballpoint pen to outline the point area with a circumference.

The anesthetic chosen to conduct the study was lidocaine in gel/base cream^{2,16}. Patients were evaluated before and after the application of lidocaine by digital pressure of the TP, previously mapped



Figure 1. Trigger point outlined after analysis of palpation on the taut muscle band

for five seconds, using a questionnaire with dichotomous scoring set in “yes” and “no” regarding the presence and/or absence of pain, respectively. The drugs were applied in concentrations of 2, 4 and 7%, with three different waiting times to start the procedure (3, 5, and 10 minutes)¹⁶, submitted in different sessions.

The study was performed in the *Centro de Especialidades Odontológicas* (CEO - Dental Specialty Center) in the city of Três Corações, Minas Gerais, Brazil. Submitted and approved by UNIVAS Research Ethics Committee, Brazil Platform, opinion 1.512.271 of 2016.

Statistical analysis

The information gathered from the questionnaires was input into a database (Microsoft Excel® – Microsoft Corporation) and statistically analyzed with the support of the SPSS® 20 for Windows (Statistical Package for Social Sciences). The data was submitted to descriptive statistical analysis and the results were expressed in percentage.

RESULTS

The instruments calibrated in this study were the concentration of lidocaine used and the drug's time of action to perform the psychotherapeutic procedure. The descriptive statistical analysis showed a painful response in all concentrations of lidocaine related to the evaluated time, except for 7% of lidocaine in a 10-minute period (Table 1). Results are indicated in figure 2 regarding time/concentration.

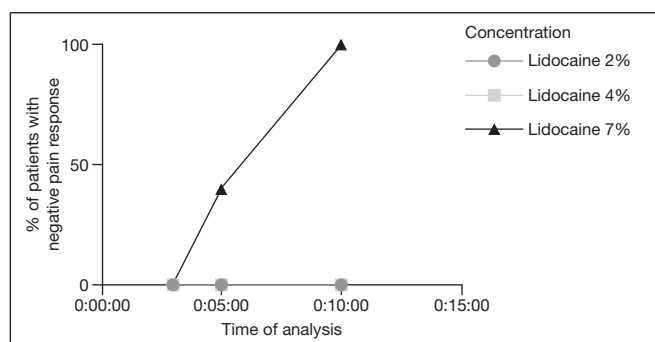


Figure 2. Negative pain responses in different concentrations of the anesthetic at different waiting times for the anesthetic effect

Table 1. Negative responses to the pressure pain questionnaire

				Patient1	Patient2	Patient 3	Patient 4	Patient 5	Total
Anesthetics concentration	2%	Time	3 min	0	0	0	0	0	
			5 min	0	0	0	0	0	
			10 min	0	0	0	0	0	
	4%	Time	3 min	0	0	0	0	0	
			5 min	0	0	0	0	0	
			10 min	0	0	0	0	0	
	7%	Time	3 min	0	0	0	0	0	
			5 min	0	1	0	0	1	40%
			10 min	1	1	1	1	1	100%

DISCUSSION

Chronic pain affects around 100 million adults, who have their quality of life and social impact inestimably affected by drugs, work disability, and depression. MPS is a muscular disorder that manifests itself through the high prevalence of chronic pain and difficult diagnosis. Control and relief of pain are necessary to maintain the well-being and quality of life of a patient with MPS, which justifies this study^{1,2,4,9,17-20}. Massage of TP during myofascial release therapy becomes a painful procedure due to the activation of proinflammatory cytokines in the region, accumulated by persistent local muscular contraction^{3,4,15,21}. Borg-Stein and Laccarino² reported that MPS treatment should start by preventing these cytokines from forming. One form of treatment proposed by the authors is the infiltrative administration of local anesthetics in the region to relieve the painful symptoms. This methodology has been showing itself effective in multiple studies, including using bupivacaine associated with antidepressant^{19,22-24}. Xie et al.²⁵ support these studies, presenting the lidocaine injection as therapy, reducing pain intensity, length and frequency of patients treated after six months of therapy. However, this type of treatment presents flaws, including injection fear by the patient, possible formation of painful stimulus and cardiovascular complications associated with the injection of antidepressants^{2,18,19,22}. Another proposed form of treatment is the topical application of anesthetics, with an expressive history of efficacy and safety to perform dermatological procedures²². For MPS treatment, the most used drugs are available as a 5% lidocaine patch and the eutectic mixture of local anesthetics (EMLA) in the form of a cream, containing prilocaine 2.5% and lidocaine 2.5%^{2,18,26}. Rauck, Busch e Marriott²⁷ noted in their studies that the effect of lidocaine in patch form associated to heat significantly decreased pain during TP release procedure. Firmani, Miralles and Casassus²⁸ used lidocaine in patch form in a 5% concentration to compare to placebo regarding pain intensity and electromyography activity of the trapezius muscle, with this being a possible MPS aggravating factor when found in hyperactivity. These authors observed that pain intensity and electromyography activity decreased in lidocaine-group patients, showing its treatment efficacy. EMLA has been widely used and its efficacy has been reported when compared to other therapies^{2,18,29,30}, but

these drugs do not satisfy their use in patients with MPS. The waiting time for its effectiveness is around one to five hours, making it impossible to use for TP release during its manipulation. The use of patch was a therapy developed in a way to stay adhered to the patient for long periods of time, not having total effectiveness in the control of pain. The development of a fast-acting local anesthetic protocol for the treatment of TPs will aid in the improvement of pain during manipulation^{5,16}. The use of anesthetic gel developed for this study influenced in the decrease of pain during TP manipulation in a way the patients did not present stress signs during pressure, indicating full desensitization of the area in a short amount of time, easing the removal of local cytokines. Lidocaine gel has proven efficacy when used in mucous tissue, such as the uterine, genitourinary and oral mucosa^{20,23,24,31-34}. Pereira et al.³⁵ showed that the use of 5% lidocaine gel in eye surgeries presented effective results regarding previous subconjunctival lidocaine injection. In cutaneous tissue, although less effective, lidocaine shows promising results in concentrations higher than 5%^{23,36}. However, Bastazini Júnior et al.³¹ reported that higher anesthetics concentration does not influence the sensitivity during dermatological procedures when compared to the same formulation in low concentration. When lidocaine is used in low concentration, it presents inferior analgesic results. According to Arab et al.³⁷, 2% lidocaine concentration presented lower local analgesic effect compared to other therapies, such as the use of icy tips during venipuncture of arteriovenous fistulas. On the other hand, this study demonstrated that the anesthetic used in the 7% concentration achieved its analgesic peak 10 minutes after its application, compared to other concentrations used with similar times in which there was a painful response. This fact makes it feasible for clinical practice when used at 7% after 10 minutes of application. No studies performed with the application of anesthetic gel for the manipulation of TP during the treatment of MPS were found in the literature. Due to the lack of evidence of this treatment methodology, it is necessary to carry out new physiotherapy clinical trials that develop a local anesthetic protocol in order to provide relief of the pain caused by myofascial release procedure. This pilot study calibrated instruments so a study with higher sample could be conducted.

CONCLUSION

This study defined as the protocol the use of 7% lidocaine topical anesthetic in a 10-minute utilization time.

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