Use of 5% lidocaine patch in the management of post-traumatic localized neuropathic pain. Case reports

O uso do emplastro de lidocaína a 5% no manejo de dor neuropática localizada pós-traumática. Relato de casos

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ABSTRACT

BACKGROUND AND OBJECTIVES: Neuropathic pain is defined as a pain caused by a lesion or condition that affects the somatosensory nervous system. Taking its prevalence into account, in particular post-traumatic localized neuropathic pain, and to discuss ways to manage patients with this condition, considering efficacy and tolerability of proposed treatments, this report presents three clinical cases of patients with post-traumatic localized neuropathic pain treated with 5% lidocaine transdermal patch in both monotherapy and polytherapy.

CASE REPORTS: This study reports the cases of three female patients aged between 29 and 81 years with complaints of pain due to trauma, who were managed with 5% lidocaine transdermal patch in prolonged treatment, with a significant improvement in pain.

CONCLUSION: According to scientific evidence, the use of 5% lidocaine transdermal patch in post-traumatic localized neuropathic pain as shown efficacy with favorable safety and tolerance. Moreover, it was possible to demonstrate that a 5% lidocaine transdermal patch in a polytherapy format has contributed to improved outcomes with no effect in treatment tolerability.

Keywords: Lidocaine, Nerve compression, Neuropathic paining, Patch testing, Transdermal patch.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor neuropática é definida como uma dor provocada por uma lesão ou doença que afeta o sistema nervoso somatossensitivo. Considerando a sua prevalência, em particular dor neuropática localizada pós-traumática, com o intuito de discutir formas de manejar os pacientes portadores dessa condição e avaliando tanto a eficácia quanto a tolerabilidade aos tratamentos propostos, este artigo apresenta três casos clínicos de pacientes portadores dessa condição, tratados com emplastro de lidocaína a 5%, tanto em monoterapia quanto no contexto da terapia multimodal.

RELATOS DOS CASOS: Este estudo relata os casos de três pacientes do sexo feminino com idades entre 29 e 81 anos e queixas de dor decorrente de trauma, que foram manejadas com emplastro de lidocaína a 5% em tratamento prolongado, com uma significativa melhora do nível de dor.

CONCLUSÃO: Em concordância com as evidências da literatura científica, o uso do emplastro de lidocaína a 5% nos casos de dor neuropática localizada pós-traumática relatados mostrou-se eficaz no manejo dessa condição e apresentou perfil de segurança e tolerabilidade favorável. Além disso, foi possível observar também que o emplastro de lidocaína a 5%, quando adicionado em abordagem multimodal, contribuiu para uma melhora no quadro sem prejuízo da tolerabilidade do tratamento.

Descritores: Compressão nervosa, Dor, Dor neuropática, Emplastro transdermal, Lidocaína, Testes do emplastro..

INTRODUCTION

According to the International Association for the Study of Pain (IASP), neuropathic pain (NP) is defined as pain caused

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HIGHLIGHTS
- Neuropathic pain has a significant impact on patients' quality of life and functionality[3,5].
- The difficulty in diagnosing localized neuropathic pain means that patients remain without adequate treatment for months or years[9].
- The following case reports show that the use of lidocaine 5% patch allows significant reduction of pain intensity with a favorable safety and tolerability profile both in monotherapy and in the context of multimodal and long-term therapy.

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by an injury or disease affecting the somatosensory nervous system[1]. In this sense, a series of harmful conditions that affect the central nervous system (CNS) and/or peripheral nervous system (PNS), specifically at the level of Aβ, Aδ and C fibers, can lead to the development of chronic neuropathic pain (CNP)[2,3]. Although prevalence estimates vary, NP affects about 10% of theopulartion[2].

This condition is characterized by being provoked by spontaneous and/or abnormal stimuli, by having a neuroanatomically correlated distribution with the affected structure, and by presenting sensory abnormalities such as allodynia and dysesthesia in the painful area[3]. Patients often complain of burning, needling, tingling, squeezing or electric shock pain, which may also be associated with loss of nociceptive, mechanical or thermal perception[3].

NP etiology is very diverse and often multifactorial, and can be produced by different diseases affecting the nervous system (for example, peripheral nerve damage or diabetic polyneuropathy) or even be associated with the context of other comorbidities (after a stroke, spinal cord injury or in multiple sclerosis, for example)[2,4].

This condition can significantly impact patients' quality of life and functionality, as it is often associated with other problems such as anxiety, depression, sleep disturbances and increased use of drugs[3,5]. Some patients have substantially lower functional and emotional *status* compared to the rest of the population[6].

At the molecular level, NP is also quite complex. There is a set of central and peripheral pathophysiological phenomena, crossings between sensory fibers with sensitization after injury, formation of ectopic foci of neuronal stimulus discharge with abnormal or dysfunctional sodium channels, expression of new ion channels or receptors, and activation of various signal pathways that regulate the induction and maintenance of neuropathic pain through transcriptional or post-translational mechanisms[7]. All these changes potentiate a state of hyperexcitability on sensory pathways[2].

It is also possible to assess NP in terms of its extent and location, as it can affect areas as extensive as a hemibody, as in cases of central pain after stroke, or a relatively restricted area, such as a specific dermatome in patients with post-herpetic neuralgia[8].

In most cases (about 60% of patients), NP is restricted to a small area, smaller than that of an A4 sheet of paper, well circumscribed and easily identifiable by the patient (such as a delimited area of the knee after prosthetic surgery)[2]. This condition is called localized neuropathic pain (LNP); traumatic injuries and the postoperative period are some of its most common etiologies[2].

The difficulty in diagnosing LNP by non-pain physicians means that patients remain without adequate treatment for months or years[9]. In order to circumvent this problem, a screening tool for LNP was developed, based on the classification system proposed by the Neuropathic Pain Special Interest Group (NeuPSIG) of the IASP, which proposes a diagnostic screening tool (Table 1), consisting of four questions focused on the patient's history and the distribution of painful symptoms and sensory signs, in addition to the delimitation of the painful zone to an area no larger than that of a sheet of A4 paper[9].

NP management is complex and multidisciplinary, requiring a thorough medical knowledge of the various underlying pain mechanisms involved and the pharmacological options available for adequate pain management and individual patient needs. The NeuPSIG proposes as 1st line for treatment of neuropathic pain the gabapentinoids, tricyclic antidepressants and selective serotonin-noradrenaline reuptake inhibitors. 5% lidocaine transdermal patch, capsaicin and tramadol were proposed by this guideline as 2nd line treatment; while strong opioids such as morphine and oxycodone and botulinum toxin would be recommended as 3rd line treatment for peripheral neuropathic pain[2].

As mentioned, one of the available pharmacological options is 5% lidocaine in the form of a transdermal patch[10]. This drug acts through two mechanisms: the pharmacological action by diffusion of lidocaine and the blocking of sodium channels at the application site, and the protective action of the hydrogel layer, which forms a mechanical barrier against stimuli capable of causing allodynia or hyperalgesia[2,10].

The dose of lidocaine absorbed systemically depends on the area of skin covered and the duration of application, with the maximum recommended daily dose being up to three patches simultaneously over a 12-hour period[11].

Topical 5% lidocaine is well tolerated and safe, and its limited systemic absorption (around 3%) reduces the risk of adverse events and interaction with other drugs[12]. Due to its favorable safety and tolerability profile, the NeuPSIG consensus makes the caveat of considering it as a first-line drug for LNP in frail and elderly patients[13], while a more recently published guideline by the SFETD (French Society for the Study and Treatment of Pain) in 2020 recommends 5% lidocaine transdermal patch as a first-line treatment in focal peripheral neuropathic pain[14].

Considering the prevalence of LNP, in particular post-traumatic LNP, and in order to discuss ways of managing patients with this condition, evaluating both efficacy and tolerability of the proposed treatments, this article presents three clinical cases of patients with this condition, treated with 5% lidocaine transdermal patch, both in monotherapy and in the context of multimodal therapy.

CASE REPORTS

The CARE (CAse REport) guidelines were used as a framework for this article[15]. The CARE guidelines are a set of international standards developed to improve the accuracy, transparency and completeness of case reports in healthcare[15]. Adherence to these guidelines was in pursuit of ensuring that case reports provide relevant and valuable information to health professionals and researchers[15]. The CARE guidelines use in this article helped to ensure that the case reports presented were of high quality, provided relevant details about the patient's condition and treatment, and could be used to inform future clinical decision-making and research efforts.

All data presented in this article were de-identified to ensure patient confidentiality. The patient provided Free and Informed Consent Term (FICT) for anonymized use of clinical data.

Case 1

A 32-year-old female patient with a three-month history of right patellar dislocation presented with burning pain, electric shock sensation, pinpricks, numbness and itching in the superolateral region of the ipsilateral knee. She had pain intensity of 8 points on the visual analog scale (VAS), graded from zero to 10, and the affected area was smaller than that of a sheet of A4 paper.

Physical examination of the patient revealed hypoesthesia to touch, hypoesthesia to needle prick and mechanical allodynia in the area of pain. Applying the diagnostic tool (Table 1), a diagnosis of post-traumatic LNP due to patellar dislocation was found.

Treatment with 5% lidocaine transdermal patch was then proposed for four weeks. When reassessed at the end of this period, there was a partial improvement in pain, with a decrease in VAS to 6, and therefore the prescription of pregabalin was associated, with a dose of 75 mg daily in the first week and 75 mg every 12 hours in the following 3 weeks.

However, after three days the patient discontinued pregabalin use by her own choice, due to adverse effects (dizziness and nausea), maintaining only the use of lidocaine patch for another four weeks, which resulted in improvement of the clinical picture, with pain reduction (VAS = 3), configuring a mild pain picture. The patient was then instructed to maintain the use of 5% lidocaine transdermal patch for another three months, during which time the VAS decreased to 2.

After the last assessment, the patient showed improvement and stopped treatment. Gradually, she increased the intensity of kinesiotherapy and currently does physical activity under supervision three times a week.

Case 2

A 29-year-old female triathlete presented with a history of right ankle trauma following a fall from a bicycle eight months previously. In the emergency department, imaging tests did not identify any fracture, despite the complaint of severe ankle pain (VAS = 8).

The first strategy was immobilization with suropodal orthosis for three weeks, application of cold compress, 10 sessions of physiotherapy with transcutaneous electrical nerve stimulation (TENS) and application of topical *arnica* every 8h for 15 days. After one month of treatment, the patient was still unable for return to physical activity and was advised to perform 20 additional physiotherapy sessions, without significant improvement.

When reassessed, the patient had pain in the right ankle medial region, with burning sensation, electric shock, pinpricks and tingling at the site, showing VAS = 6.

On physical examination, the patient had mild flat feet and physiological hindfoot valgus, unaltered toe tip test, joint hypermobility and pain on extension of the right ankle, without impairment of strength and reflexes. Sensory evaluation revealed hypoesthesia to touch in the medial region of the same ankle. Lasègue, Forst and Bowstring tests were negative.

LNP diagnostic tool application[8], taking into account that the area of pain was smaller than that of a sheet of A4 paper, pointed to the final diagnosis of osteochondral lesion on talus due to ankle sprain, evolving with LNP.

It was proposed the use of tramadol 50 mg every 6h for 15 days, associated with 5% lidocaine transdermal patch for 4 weeks, in addition to the reorganization of the patient's physiotherapeutic rehabilitation.

After four weeks of treatment, pain improved, with a decrease in VAS = 4, and a reduction in neuropathic symptoms, especially tingling and burning. At this point, it was decided to maintain 5% lidocaine transdermal patch, associated with pregabalin 150 mg daily (75 mg every 12 hours) and dipyrone 1 g every 6 hours, in addition to physiotherapy.

The patient was re-evaluated in four weeks, with a decrease in VAS = 3, which allowed her to return to her sports activities (cycling and swimming). However, the patient still complained of discomfort with hypoesthesia to the touch and had difficulty extending the ankle, so an arthroscopic surgical approach was indicated.

In the immediate postoperative period, etoricoxib 90 mg daily for five days and tramadol 100 mg every 6 h were prescribed. Pregabalin 150 mg at night was maintained, while 5% lidocaine transdermal patch was discontinued (due to the recommendation that it could not be used over the raw area of the surgical wound).

One month after the procedure, with VAS = 1 and minimal complaints of neuropathic symptoms, the patient weaned off tramadol (in the sixth postoperative week she was no longer using the drug). She used pregabalin 150 mg for 3 months, decreasing to 75 mg for 2 weeks and 50 mg for 2 weeks. Currently without pregabalin, she has intensified rehabilitation and is satisfied, as after 6 months of arthroscopy she is gradually returning to running, and has been swimming and cycling since the first month postoperatively.

Case 3

Female patient, 81 years old, with a history of osteoporosis. She presented with a fracture of the L1, L2 and L3 vertebrae after a fall from her own height, evolving with a complaint of severe daily pain in the lumbar region radiating to the right lower limb (RLL) up to knee, with impaired walking, pain on palpation of the high lumbar region and allodynia in the right thigh. The attending orthopedic team chose not to indicate surgical treatment, and a transforaminal epidural block with corticosteroids was indicated.

The patient presented improvement of low back pain, but maintained pain of significant intensity, VAS = 7, in the anterior aspect of the right thigh, associated with burning sensation, needling, shock and numbness at the site. In the sensory evaluation, she presented mechanical allodynia in the same area, whose extension was equivalent to that of a sheet of A4 paper.

Using the diagnostic tool rationale (Table 1), the diagnostic hypothesis of LNP due to post-traumatic nerve compression of the lumbar spine was developed.

Treatment with 5% lidocaine transdermal patch was indicated, covering the area of maximum pain, with reassessment in four weeks. After this period, there was a favorable therapeutic response, with a reduction to VAS = 3, and it was proposed to maintain 5% lidocaine transdermal patch for another four weeks.
On return, the patient reported VAS = 1, and due to the positive response to treatment, it was decided to maintain the drug with follow-up every two months.

Table 1. Screening tool for probable neuropathic pain and localized neuropathic pain. Adapted[8]

1. Does the patient's history suggest a relevant nerve lesion or disease?
2. Is the pain distribution neuroanatomicaly plausible?
3. Does the neurological examination reveal any negative or positive sensory sign in the area of the presumably lesional nerve?
4. In the most painful area cirumscribed and small than an A4 paper?
"Yes'" Answers to the first 3 questions = probable neuropathic pain
"Yes" answers to all first 4 questions = localized neuropathic pain

DISCUSSION

In the first case, a patient with a diagnosis of post-traumatic LNP due to patellar dislocation was presented, for whom the use of 5% lidocaine transdermal patch allowed a significant reduction in pain intensity with good tolerability, while the attempt to associate it with a systemic treatment led to the triggering of adverse events. This fact is in line with that reported in a study, in which research comparing 5% lidocaine transdermal patch *versus* pregabalin in the treatment of LNP showed that, despite similar analgesic efficacy, 5% lidocaine transdermal patch had a more favorable safety profile[15].
The second case showed a patient with osteochondral lesion of the talus due to ankle sprain, evolving to LNP, with good response to treatment with 5% lidocaine transdermal patch combined with pregabalin. The multimodal approach contributed to the reduction of the patient's pain intensity, allowing the gradual recovery of her daily activities. She evolved to an indication for surgical procedure, requiring postoperative systemic therapeutic support, which enabled complete rehabilitation, with persistence of minimal neuropathic symptoms.
This result is in line with that reported by a study evaluating the efficacy of combining 5% lidocaine transdermal patch with pregabalin in the treatment of patients with LNP caused by post-herpetic and painful diabetic neuropathy. In this study, it was observed that in patients who did not respond well to monotherapy (both with pregabalin and 5% lidocaine transdermal patch), the multimodal approach with the two combined treatments resulted in improved therapeutic response, with good tolerability and, in some cases, even allowing the reduction of the daily doses of pregabalin used, reducing the incidence of adverse events[16].
Finally, the third clinical case discusses the history of a patient diagnosed with LNP due to post-traumatic nerve compression of the lumbar spine, who required the use of 5% lidocaine transdermal patch for a prolonged period, with satisfactory therapeutic response, and who maintained use with follow-up and evaluation every two months.

There are reports in the scientific literature regarding the use of 5% lidocaine in the treatment of post-traumatic LNP. One study[17] followed 7 patients with post-traumatic LNP over a period of months and found that the mean pain intensity value had decreased by 78%, from 8.6 at baseline to 1.9 (VAS), and no adverse events were considered related to the use of lidocaine patch.
Another study reported that after treatment with 5% lidocaine for five years, 45.5% of patients with post-traumatic or postoperative NP had reported a reduction in pain intensity of more than 50%[18].
The results reported in the present study therefore corroborate what has been reported in studies with patients with LNP of various etiologies, including post-traumatic causes, for which the use of lidocaine patch has been shown to be effective and well tolerated in the management of this condition, either as a single treatment or in the context of multimodal therapy[14].

CONCLUSION

In agreement with the evidence from the scientific literature, the use of 5% lidocaine transdermal patch in the reported cases of post-traumatic LNP proved to be effective in the management of this condition and presented a favorable safety and tolerability profile. In addition, it was also possible to observe that the 5% lidocaine transdermal patch, when added in a multimodal approach, contributed to an improvement in the condition without impairing the tolerability of the treatment.

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AUTHORS' CONTRIBUTIONS

André Liggieri
Statistical Analysis, Funding Acquisition, Data Collection, Conceptualization, Resource Management, Project Management, Investigation, Methodology, Writing - Preparation of the Original, Writing - Review and Editing, Software, Supervision, Validation and Visualization
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