

Extracorporeal shock wave treatment in plantar fasciitis with an associated neuropathic component. How to optimize the result?

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Abstract

Introduction: Current evidence supports the use of radial pressure wave and focused extracorporeal shock wave treatment (ESWT) for the treatment of chronic plantar fasciitis that does not improve with conservative treatment. Studies show that a quarter of plantar fasciitis may have an associated neuropathic component and the literature shows that neuropathic pain causes more intense pain and greater functional disability. However, there is a lack of literature on the results of ESWT in tendinopathies associated with the neuropathic pattern.

Case report: We report a case of plantar fasciitis with central sensitization and associated neuropathic component. At first, pregabalin 75mg twice a day was used, which improved the neuropathic pattern. After that, 3 sessions were performed with piezoelectric ESWT with energy of 0.12 mJ/mm², 2000 impulses at a frequency of 8 Hz, once a week for three weeks. The patient was followed up for 3 months and had complete improvement of symptoms without functional limitation for activities of daily living.

Conclusion: This case report serves to draw attention to the importance of evaluating and treating the neuropathic pattern associated with tendinopathies in order to optimize the therapeutic result. However, randomized clinical trials are lacking to determine the real difference in results between using ESWT in nociceptive pain or in mixed pain with an associated neuropathic component.

Keywords: chronic pain, plantar fasciitis, mixed pain, neuropathic pain, shockwaves.

Introduction

Focused extracorporeal shock wave treatment (F-ESWT) and radial pressure wave treatment (RPW) are non-invasive treatments in which the mechanical energy created by these different methods is transformed into a biological response through a mechanism called mechanotransduction. This mechanical stimulus generates biological responses with tissue regeneration and analgesia. One of the most supported indications in the literature is tendinopathy, including plantar fasciitis, in which the usual conservative treatment was considered insufficient and already presented more than 6 months of evolution.¹

Plantar fasciitis is diagnosed, in most cases, by the history and physical examination findings alone, and appropriate treatment of plantar fasciitis requires sufficient understanding of the patient's chronicity of symptoms.² The nociceptive pain is more common in these cases, however some studies indicate that

around a quarter of cases may have associated neuropathic pain, configuring a mixed pain pattern.³

The objective of this article is to present an illustrative case report and the hypothesis that treating the neuropathic component before performing the ESWT can optimize the outcome and allow for a less painful session for the patient.

Case Presentation

A 60-year-old patient, female, with pain in the plantar region of the right calcaneus for 6 months, more severe on the first step of the day, with worsening of symptoms in the last 2 months and the appearance of symptoms of burning, tingling, electric shock and itching. She previously underwent treatment with analgesics and non-steroidal anti-inflammatory drugs, guided stretching, and physiotherapy without improvement of symptoms.

Diagnostic assessment:

On physical examination, the patient presents significant pain only when touching the entire medial and plantar region of the foot, to the point that it is not possible to carry out an adequate examination of palpation of specific points due to pain.

This patient's clinical picture suggests a mixed pain pattern with an association of nociceptive and neuropathic pain. Probable neuropathic pain was identified through changes in sensory examinations and Douleur Neuropathique 4 (DN4) questionnaire with a positive score of 6 points (Fig. 1).

Foot MRI documented fasciopathy (Fig. 2), lumbar MRI did not show radicular compression, electroneuromyography showed no alterations, and venous doppler USG identified varicose veins.

Therapeutic intervention:

Treatment was instituted with 75mg of

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DN4 Questionnaire

Please complete this questionnaire by ticking one answer for each item in the 4 questions below:

INTERVIEW OF THE PATIENT

Question 1: Does the pain have one or more of the following characteristics?

	yes	no
1 - Burning	<input type="checkbox"/>	<input type="checkbox"/>
2 - Painful cold	<input type="checkbox"/>	<input type="checkbox"/>
3 - Electric Shocks	<input type="checkbox"/>	<input type="checkbox"/>

Question 2: Is the pain associated with one or more of the following symptoms in the same area?

	yes	no
4 - Tingling	<input type="checkbox"/>	<input type="checkbox"/>
5 - Pins and Needles	<input type="checkbox"/>	<input type="checkbox"/>
6 - Numbness	<input type="checkbox"/>	<input type="checkbox"/>
7 - Itching	<input type="checkbox"/>	<input type="checkbox"/>

EXAMINATION OF THE PATIENT

Question 3: Is the pain located in an area where the physical examination may reveal one or more of the following characteristics?

	yes	no
8 - Hypoesthesia to touch	<input type="checkbox"/>	<input type="checkbox"/>
9 - Hypoesthesia to prick	<input type="checkbox"/>	<input type="checkbox"/>

Question 4: In the painful area, can the pain be caused or increased by:

	yes	no
10 - Brushing	<input type="checkbox"/>	<input type="checkbox"/>

Figure 1: DN4 questionnaire was developed by the French Neuropathic Pain Group and is a simple and objective tool, with the ability to distinguish nociceptive from neuropathic pain. Each positive item is equivalent to 1 point and a score equal to or greater than 4 is indicative of neuropathic pain.^{4,5}

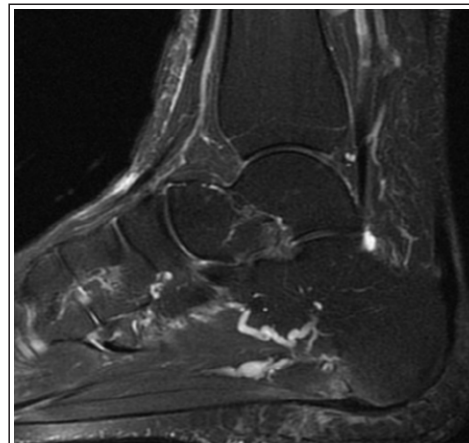


Figure 2: The thickness of the plantar fascia (PF), findings of a high-signal intensity area inside the PF, edema around the PF, and bone marrow edema of the calcaneus are MRI typical findings of PF.6.

pregabalin twice a day for 30 days and guidance on stretching exercises and for intrinsic foot muscles, and the patient was reassessed in 30 days. Upon return after 30 days, the patient presented a different clinical presentation, with pain only in the first steps of the day and physical examination typical of chronic plantar fasciopathy, with pain only in the medial insertion of the proximal plantar fascia.

Treatment with piezoelectric focal Shock Waves was then indicated, 3 sessions with energy 0.12 mJ/mm², 2000 impulses at a frequency of 8 Hz, once a week for three weeks.

Outcomes:

The patient was followed up for 3 months and had complete improvement of symptoms without functional limitation for activities of daily living.

Discussion

Lower limb tendinopathy conditions are common causes of chronic musculoskeletal pain. While many of these will improve over 12 months, about 10%–35% of patients can be left with ongoing symptoms that can have a significant impact on quality of life. A possible cause for unsatisfactory results from the treatment of tendinopathies is central sensitization and the associated neuropathic

component. Wheeler et al.⁷ demonstrated that about a quarter of 312 patients with lower limb tendinopathy have central sensitization. In this study, 110 patients with plantar fasciitis were evaluated and 23.6% had central sensitization.

Neuropathic pain is associated with increased drug prescriptions and visits to health care providers. Patients typically experience a distinct set of symptoms, such as burning and electrical-like sensations, and pain resulting from non-painful stimulations (such as light touching); the symptoms persist and have a tendency to become chronic and respond less to pain medications. Sleep disturbances, anxiety and depression are frequent and severe in patients with neuropathic pain, and quality of life is more impaired in patients with chronic neuropathic pain than in those with chronic non-neuropathic pain that does not come from damaged or irritated nerves.⁸ Wheeler et al.³ documented that 29% of lower limb tendinopathy (n = 282) and 26% of plantar fasciitis (n = 126) had neuropathic pain according to the painDETECT questionnaire.

In these cases of mixed pain, the literature demonstrates worse results with the usual treatments for nociceptive pain without the association of first-line medications for neuropathic pain. In the case of this patient, we opted for pregabalin, which is a gabapentinoid anticonvulsant indicated as the first line of treatment for neuropathic pain by most current guidelines. Despite the short time of use of pregabalin for a sustained result, there was a significant improvement in the neuropathic pattern after one month of using 75mg of pregabalin twice a day. The

improvement of the neuropathic component made the nociceptive pattern of plantar fasciitis more preponderant, which usually has good results with ESWT based on the literature and clinical practice.1,8-13

Conclusion

In conclusion, this case report demonstrates the importance of assessing the presence of

mixed pain in tendinopathies. The literature reports that neuropathic pain leads to more intense pain and greater functional disability, despite this there is still a lack of studies showing the relationship of worse results when ESWT is indicated in tendinopathies with an associated neuropathic component. However, clinical practice has shown worse results and greater difficulty in applying

ESWT in these cases, so it is important to develop randomized clinical trials to confirm or refute this hypothesis.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

Conflicts of Interest: Nil. **Source of Support:** None.

References

- Moya D, Ramón S, Schaden W, Wang CJ, Guiloff L, Cheng JH. The Role of Extracorporeal Shockwave Treatment in Musculoskeletal Disorders. *J Bone Joint Surg Am.* 2018 Feb 7;100(3):251-263. doi: 10.2106/JBJS.17.00661.
- Schneider HP, Baca JM, Carpenter BB, Dayton PD, Fleischer AE, Sachs BD. American College of Foot and Ankle Surgeons Clinical Consensus Statement: Diagnosis and Treatment of Adult Acquired Infracalcaneal Heel Pain. *J Foot Ankle Surg.* 2018 Mar-Apr;57(2):370-381. doi: 10.1053/j.jfas.2017.10.018.
- Wheeler PC. Neuropathic pain may be common in chronic lower limb tendinopathy: a prospective cohort study. *Br J Pain.* 2017 Feb;11(1):16-22. doi: 10.1177/2049463716680560.
- Bouhassira D, Attal N, Alchaar H, Boureau F, Brochet B, Bruxelle J, Cunin G, Fermanian J, Ginies P, Grun-Overdyking A, Jafari-Schlupe H, Lantéri-Minet M, Laurent B, Mick G, Serrie A, Valade D, Vicaut E. Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (Dn4). *Pain.* 2005 Mar;114(1-2):29-36. doi: 10.1016/j.pain.2004.12.010.
- Santos JG, Brito JO, de Andrade DC, Kaziyama VM, Ferreira KA, Souza I, Teixeira MJ, Bouhassira D, Baptista AF. Translation to Portuguese and validation of the Douleur Neuropathique 4 questionnaire. *J Pain.* 2010 May;11(5):484-90. doi: 10.1016/j.jpain.2009.09.014.
- Maki M, Ikoma K, Kido M, Hara Y, Sawada K, Ohashi S, Kubo T. Magnetic resonance imaging findings of chronic plantar fasciitis before and after extracorporeal shock wave therapy. *Foot (Edinb).* 2017 Dec;33:25-28. doi: 10.1016/j.foot.2017.10.002.
- Wheeler PC. Up to a quarter of patients with certain chronic recalcitrant tendinopathies may have central sensitisation: a prospective cohort of more than 300 patients. *Br J Pain.* 2019 Aug;13(3):137-144. doi: 10.1177/2049463718800352.
- Colloca L, Ludman T, Bouhassira D, Baron R, Dickenson AH, Yarnitsky D, Freeman R, Truini A, Attal N, Finnerup NB, Eccleston C, Kalso E, Bennett DL, Dworkin RH, Raja SN. Neuropathic pain. *Nat Rev Dis Primers.* 2017 Feb 16;3:17002. doi: 10.1038/nrdp.2017.2.
- Attal N, Cruccu G, Baron R, Haanpää M, Hansson P, Jensen TS, Nurmikko T. EFNS guidelines on the pharmacological treatment of neuropathic pain: 2010 revision. *Eur J Neurol.* 2010 Sep;17(9):1113-e88. doi: 10.1111/j.1468-1331.2010.02999.x.
- Finnerup NB, Attal N, Haroutounian S, McNicol E, Baron R, Dworkin RH, Gilron I, Haanpää M, Hansson P, Jensen TS, Kamerman PR, Lund K, Moore A, Raja SN, Rice AS, Rowbotham M, Sena E, Siddall P, Smith BH, Wallace M. Pharmacotherapy for neuropathic pain in adults: a systematic review and meta-analysis. *Lancet Neurol.* 2015 Feb;14(2):162-73. doi: 10.1016/S1474-4422(14)70251-0.
- Gerdesmeyer L, Frey C, Vester J, Maier M, Weil L Jr, Weil L Sr, Russlies M, Stienstra J, Scurran B, Fedder K, Diehl P, Lohrer H, Henne M, Gollwitzer H. Radial extracorporeal shock wave therapy is safe and effective in the treatment of chronic recalcitrant plantar fasciitis: results of a confirmatory randomized placebo-controlled multicenter study. *Am J Sports Med.* 2008 Nov;36(11):2100-9. doi: 10.1177/0363546508324176.
- Gollwitzer H, Saxena A, DiDomenico LA, Galli L, Bouché RT, Caminear DS, Fullem B, Vester JC, Horn C, Banke IJ, Burgkart R, Gerdesmeyer L. Clinically relevant effectiveness of focused extracorporeal shock wave therapy in the treatment of chronic plantar fasciitis: a randomized, controlled multicenter study. *J Bone Joint Surg Am.* 2015 May 6;97(9):701-8. doi: 10.2106/JBJS.M.01331.
- Morrissey D, Cotchett M, Said J'Bari A, Prior T, Griffiths IB, Rathleff MS, Gulle H, Vicenzino B, Barton CJ. Management of plantar heel pain: a best practice guide informed by a systematic review, expert clinical reasoning and patient values. *Br J Sports Med.* 2021 Oct;55(19):1106-1118. doi: 10.1136/bjsports-2019-101970.

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