

Refractory chronic ankle pain controlled with pulsed radiofrequency. Case report*

Dor crônica refratária de tornozelo controlada com radiofrequência pulsada. Relato de caso

Lia Rachel Chaves do Amaral Pelloso¹, George Miguel Góes Freire², Hazem Adel Ashmawi³

*Received from the Federal University of Mato Grosso. Cuiabá, MT.

SUMMARY

BACKGROUND AND OBJECTIVES: Radiofrequency (RF) is an alternate current with oscillation frequency of 500,000 Hz, which has been successfully used to treat some morbidities evolving with chronic pain. This case report aimed at showing the successful use of sural nerve pulsed RF to treat chronic ankle pain.

CASE REPORT: Female patient, 60 years old, with right ankle pain for five years, refractory to treatment with opioids, non-steroid anti-inflammatory drugs (NSAIDs), dipirone, antidepressants and anticonvulsants, physical therapy, localized infiltrations, acupuncture and insole. Patient was submitted to right sural nerve pulsed RF. Needle was inserted in the line between the Achilles tendon and lateral malleolus, initial Achilles tendon region and final soleus and gastrocnemius muscles region. Sensory stimulation to identify the sural nerve was with 0.5 volts and 50 Hz. Pulsed current was applied for 140 seconds with 45 volts and temperature of up to 42° C. Patient was submitted to two sessions with improvement of approximately 80% of pain, allowing her to walk or to remain standing up without major difficulties.

CONCLUSION: Sural nerve pulsed RF may be an option to control chronic ankle pain.

Keywords: Ankle, Chronic pain, Treatment with pulsed radiofrequency.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A radiofrequência (RF) é uma corrente alternada com frequência de oscilação de 500.000 Hz, que tem sido usada com sucesso no tratamento de algumas morbidades que cursam com dor crônica. O objetivo deste relato de caso foi mostrar o uso bem sucedido da RF pulsátil do nervo sural para o tratamento de dor crônica no tornozelo.

RELATO DO CASO: Paciente do sexo feminino, 60 anos, que há 5 anos apresentava dor em tornozelo direito, refratária ao tratamento com opioides, anti-inflamatório não esteroides (AINES), dipirona, antidepressivos e anticonvulsivantes, fisioterapia, infiltrações localizadas, acupuntura e palmilha. A paciente foi submetida a aplicação de RF pulsátil de nervo sural direito. O local da inserção da agulha foi na linha entre o tendão de Aquiles e maléolo lateral, região inicial de tendão de Aquiles e final dos músculos sóleo e gastrocnêmio. A estimulação sensitiva para identificação do nervo sural foi com 0,5 volts e 50 Hz. A corrente pulsátil foi aplicada durante 140 segundos com 45 volts com temperatura de até 42° C. Foram realizadas duas aplicações, ocorrendo melhora de cerca de 80% da dor, permitindo que a paciente pudesse deambular ou permanecer em pé, sem maiores dificuldades.

CONCLUSÃO: A RF pulsátil do nervo sural pode ser uma opção para o controle das dores crônicas em tornozelo.

Descritores: Dor crônica, Tornozelo, Tratamento por radiofrequência pulsada.

INTRODUCTION

Radiofrequency (RF) is an alternate current with oscillation

1. Anesthesiologist, Pain Acting Area Certificate, SBA/AMB, Assistant Professor, Federal University of Mato Grosso. Cuiabá, MT, Brazil.

2. Anesthesiologist, Pain Acting Area Certificate, SBA/AMB, Member of the Pain Control Team, Central Institute, Clinicas Hospital, School of Medicine, University of São Paulo (HC-FMUSP). São Paulo, SP, Brazil.

3. Physician. Professor. Supervisor of the Pain Control Team, Central Institute, Clinicas Hospital, School of Medicine, University of São Paulo (HC-FMUSP). São Paulo, SP, Brazil.

Correspondence to:

Lia Rachel Chaves do Amaral Pelloso, M.D.

Rua Des. José de Mesquita, 371/602

78005-560 Cuiabá, MT.

E-mail: liarachel@hotmail.com.br

lation frequency of 500,000 Hz, which has been successfully used to treat some morbidities evolving with chronic pain, such as facet pain, sacroiliitis, discogenic and radicular pain, among others¹⁻⁴. However, technical characteristics of this procedure are limited in the treatment of peripheral nerve injuries.

Major advantage of pulsed RF as compared to continuous RF is that its effect is not nervous tissue thermal destruction. In this modality, current is released in pulses, each one lasting 20 milliseconds, followed by 480 milliseconds of inactivity, allowing heat to dissipate and preventing local temperature increase. Continuous RF induces coagulative necrosis leading to Wallerian degeneration, while pulsed RF only induces mild transient edema affecting structural nerve integrity^{5,6}. Even when RF is performed at 40°, there is neural edema and severe transverse fibers injury. These changes may be present with pulsed RF, but their intensity is much lower⁷.

This study aimed at describing a case of chronic ankle pain successfully treated with pulsed RF.

CASE REPORT

Female patient, 60 years old, slim, body mass index (BMI) = 28 kg/m², retired, referring right ankle pain for 5 years after severe torsion conservatively treated. Patient reports that since 2006 she has looked for medical assistance having visited 14 physicians of different specialties, including orthopedists, rheumatologists, physiatrists and pain therapists. Patient was submitted to several treatments with opioids, non-steroid anti-inflammatory drugs (NSAIDs) and dipirone, several physical therapy techniques, localized infiltrations, acupuncture and insole.

However, since the beginning of the treatment in 2006 she has never improved.

In early 2011, after diagnosis of Lateral Impact syndrome (fibular talus and calcaneus talus) patient was submitted to fibular tenoplasty.

In August 2011, she looked for a pain therapy specialist with pulsing, stabbing, continuous and very severe pain on right lateral ankle and hindfoot, with functional limitation, which would worsen when walking or remaining in the standing position for a long time.

Physical evaluation has not shown trophic changes. She had preserved painful, thermal and tactile sensitivity.

Due to difficult to control chronic pain, we started treatment with duloxetine (30 mg/day), increased after 15 days (60 mg/day) and physical therapy, however without improvement.

Patient was referred to the Pain Therapy Service, Divi-

sion of Anesthesia of the Central Institute, Clinicas Hospital, School of Medicine of the University of São Paulo where after a multidisciplinary evaluation she was submitted to right sural nerve diagnostic block with 4 mL of 0.25% bupivacaine, with epinephrine, in the middle third of right leg lateral face.

After infiltration, patient reported total pain remission in right submalleolar region. Some days later patient was submitted to pulsed RF of right sural nerve with 22 G needle, 5.4 cm long and with 2 mm of active tip (Baylor, Canada). Needle was inserted between the Achilles tendon and the lateral malleolus, initial Achilles tendon region and final region of soleus and gastrocnemius muscles. Sensory stimulation to identify the sural nerve was with 0.5 volts with temperature of up to 42° C. Two lesions were performed. There has been almost complete remission, with approximately 80% pain improvement, allowing patient to walk or stand up with no major difficulties.

DISCUSSION

In spite of extensive diagnostic investigation along the pain period, which was refractory to surgical, drug, physical therapy and acupuncture treatment, pain was controlled by pulsed RF applied to the sural nerve.

Sural nerve is a sensory nerve innervating the lateral surface of foot and ankle. It is the cutaneous nerve most widely used as donor for injury reconstruction surgeries with grafts⁸. Symptoms of its removal are in general well tolerated and consist of lateral foot anesthesia or hypoesthesia.

It is also used for nerve biopsy for diagnostic elucidation. Neuropathic pain as a function of deafferentation and nervous injury is uncommon⁹. We decided for pulsed RF and not continuous RF due to the possibility of inducing neuropathic pain, even being a rare complication described for the sural nerve. Treatment sequence was adequate with previous diagnostic anesthetic block for the patient to evaluate the likely evolution after RF.

Patient was informed about possible pulsed RF side effects, but due to pain discomfort for so many years, she decided for the treatment, which was highly satisfactory, with almost complete pain remission.

The exact mechanism of pulsed RF antinociceptive effect is still unknown. It is believed that RF produces a very weak magnetic field without significant biological effects¹⁰. There is the generation of an electric field around the active tip, which could cause molecular load changes with modification of cell functions without increasing the temperature¹¹, increased early expression gene ex-

pression, c-Fos in dorsal horn neurons¹² and increased descending inhibitory pathways after sciatic nerve RF¹³. The literature has already the description of pulsed RF to treat ankle pain⁶. Our case represents an advance with regard to previous case. One limitation of the study is the non previous use of antidepressants or drugs of the gabapentinoid group, which could have avoided RF. In our patient, antidepressants and anticonvulsants were ineffective. RF was indicated after failure of previous treatments.

CONCLUSION

Sural nerve pulsed RF may be an option to control chronic lateral ankle pain.

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