

Pulsed Radiofrequency Application in the Entrapment Neuropathy of a Sural Nerve

Sural Sinirin Tuzak Nöropatisinde Pulse Radiofrekans Uygulaması

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Abstract

Compressive and entrapment neuropathy of the peroneal nerve is the most common entrapment syndrome in the lower limbs, often caused by mechanical or dynamic compression of a segment of nerve at the level of the fibula head. Because of its special anatomic situation, external compression while under trauma or traction is quite easy. A case of entrapment neuropathy syndrome in a 33-year-old man treated by pulse radiofrequency to the lateral cutaneous branch of the common peroneal nerve is presented.

Key Words: Entrapment neuropathy, lateral sural cutaneous nerve, pulsed radiofrequency

Özet

Peroneal sinirin basınç ve tuzak nöropatisi en yaygın nöropatisi olup, alt ekstremitelerde genellikle sinirin mekanik veya dinamik bir nedenle fibula başı seviyesinde sıkışması nedeniyle oluşur. Çünkü fibulanın spesifik anatomik yapısı harici bası, travma veya traksiyon izin verir. Biz bu olguda peroneal sinirin lateral kutanöz dalına pulse radiofrekans uygulaması ile tedavi edilen 33 yaşında bir erkek hastayı sunmayı amaçladık.

Anahtar Kelimeler: Lateral kutanöz sinir, Pulse radiofrekans, Tuzak nöropati

Introduction

Compressive and entrapment neuropathy of the common peroneal nerve is the most common entrapment syndrome in the lower limbs, often caused by mechanical or dynamic compression at the level of the fibula head [1]. Because of its special anatomic situation, the nerve is frequently subjected to external compression during trauma or traction [2]. Entrapment of peripheral nerves occurs often, adversely affecting quality of life due to the pain syndrome. Analgesic medications are often useless. The management of chronic pain, originating from the entrapment of peripheral nerves, includes using anti-inflammatory medications, physical therapy manipulation, steroid injections, neurolytic blocks and surgical applications [3]. When these methods are ineffective or have adverse effects, pulsed radiofrequency can be performed as an effective, safe, minimally ablative technique that works below 42°C. The nerves are affected reversibly, as demonstrated by the lack of a significant difference upon pathological examination of the nerves after the treatments performed below 42°C during the experimental trials [4, 5]. Herein, we report the case of a 33-year-old male patient with entrapment of the lateral sural cutaneous nerve, a sensorial branch of the common peroneal nerve, in the popliteal fossa due to accidental fibular fracture. The patient underwent two subsequent surgical revisions. The pain, refractory to medications such as analgesic-anti inflammatory drugs and surgical revision, was treated successfully by pulse radiofrequency.

Case Report

Fracture of the right fibula caused by penetrating extremity trauma in a 33-year-old man was treated by open reduction to plate

the fibula. Upon presentation at our clinic, the patient had suffered from severe pain (verbal numerical analog scale (VNRS) was 8-9) and tingling in the external border of the proximal calf for three years. He also underwent surgical open decompressions twice for scar formation due to fibular fracture. The pain has been experienced continuously and is exacerbated by pressure or movement and refractory to anti-inflammatory medications, physical therapy manipulation, steroid injections, as well as antidepressant and anticonvulsant (fluoxetine and gabapentin) therapy. The patient became frustrated and depressed due to functional limitations and persistent pain. The pain has persisted since the accident and worsened following surgical approaches for open decompression due to scar tissue formation. This resulted in severe pain and functional limitations associated with muscle weakness due to disuse, labeled as a nerve entrapment syndrome affecting the lateral sural cutaneous branch of the common peroneal nerve. All electrodiagnostic studies of peroneal sensory and motor nerve conduction were performed with standard techniques; the results supported a diagnosis of peroneal entrapment neuropathy. The medication currently prescribed for our case is morphine sulfate (one 60 mg cap a day by oral administration, Meslon micropellet capsule®, NOBEL) for two months. Although the patient experienced incomplete pain relief after morphine sulfate, he could not walk without help. The most critical findings upon physical examination were sensitivity, discomfort and Tinel's sign elicited near the surgical scars innervated by the common peroneal nerve and its branches. In addition, knee joint, leg motions and functional activities such as walking and standing were limited because of persistent pain, discomfort and muscular disuse weakness. Firstly, 3 ml of 1% lidocaine was administered twice a week to the patient while he was in a prone position for test blockade of the lateral sural

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cutaneous nerve. Treatment was successful. Thus, it was decided to perform pulse radiofrequency to the lateral sural cutaneous branch of common peroneal nerve to manage the pain. The patient was admitted to the theater, and the popliteal fossa was cleaned with anti-septic solution. Sterile drapes were positioned with the patient lying prone. Then a 21-gauge radiofrequency stimulator jet (thermo-coupled electrode) needle was inserted vertically toward the lateral sural cutaneous branch of the common peroneal nerve. The deep portion of the needle and the location of the nerve were verified by the guidance of neurostimulation with a pulse radiofrequency generator. Sensory and motor functioning of the right lower extremity were checked. After stimulation to confirm the lack of motor innervation by stimulation, pulse radiofrequency was applied with 20-millisecond bursts at a frequency of 2 per second (2 Hz) for a total of 4 minutes. At the end of the application, complete pain relief was achieved. The application was performed twice for a duration of 120 seconds each time; the temperature at the needle tip did not exceed 42°C. The patient was discharged free of pain and referred to physical therapy to restore flexibility and strengthen lower-extremity muscles. Five months later the pain was scored 2-3 with a little sensation lost in the lateral surface of the proximal third of the calf.

Discussion

Conservative or surgical treatment of the pain due to nerve entrapment syndromes must address the causative etiology of nerve compression [2]. Our results demonstrated that surgery is the most appropriate approach to treatment. However, the same surgical treatment approach will not be appropriate for every entrapment neuropathy patient. Additional treatment approaches will be dictated by disease etiology, structural integrity of the nerve, and a patient's response to a particular treatment. Neuropathic pain syndromes of the entrapment nerves often appear to be less responsive than nociceptive pain to drugs such as opioid antidepressants and anticonvulsants. Therefore, complete pain control is rarely achievable. Treatment of neuropathic pain still remains a major clinical disorder [6]. Although both conservative and surgical medications were applied to the patient, these were ineffective. Pulse radiofre-

quency may be considered as an add-on therapy for patients failing to respond to other attempts at pain management in the context of pain due to entrapment neuropathy that involve conservative and surgical decompression. A histopathological study by Tun et al. and another experimental histological study by Podhajsky et al. showed no significant difference in pathology of the nerve after pulse radiofrequency applications below 42°C [4, 5]. Although pulse radiofrequency has been applied for chronic intractable pain relief for years, there are few studies documenting the efficacy of pulse radiofrequency with regard to the entrapment of peripheral nerves.

This is the first case report to our knowledge to examine the use of pulse radiofrequency to manage pain related to nerve entrapment neuropathy syndrome. Similar studies need to be performed on larger groups of patients to identify the most effective method for the management of pain syndromes due to entrapment neuropathy.

Conflict of interest statement: The authors declare that they have no conflict of interest to the publication of this article.

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