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CASE REPORT

Peripheral nerve stimulation (PNS): A valid and definitive therapeutical option for a case of anterior cutaneous nerve entrapment syndrome (ACNES)

Periferal sinir stimülasyonu (PNS): Anterior kutanöz sinir sıkışma sendromu (ACNES) olgusu için geçerli ve kesin bir tedavi seçeneği

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Summary

Anterior cutaneous nerve entrapment syndrome (ACNES) is a cause of moderate to severe chronic pain, hyperesthesia/hypoesthesia, and altered perception of heat/cold in a specific region of the anterior abdominal wall, referable to the territory of innervation of one or more anterior branches of the intercostal nerves. None of the therapeutic options currently available has proved to be effective in the long term or decisive. In recent years, we have begun to treat purely sensory neuropathies, such as this, with the implantation of wireless peripheral nerve stimulators (PNS), achieving the safety of modular and personalized analgesia. We report the case of a 41-year-old man suffering from ACNES of the 8th intercostal nerve for two years. We first performed two consecutive ultrasound-guided diagnostic blocks of the anterior cutaneous branch of the 8th intercostal right nerve and then elected the patient for ultrasound-guided nerve decompression followed by neuromodulation and pulsed-radiofrequency (PRF). Taking into account full employment, young age, and the likelihood of having to repeat the treatment several times, we considered him for Peripheral Nerve Stimulation (PNS) implantation under ultrasound guidance, and we implanted the wireless lead at the anterior branch of the right 8th intercostal nerve, and programmed tonic stimulation 100 Hz PW 200 ms. The patient reported immediate pain relief and never took medication for this problem again, at two years follow-up. PNS has had an increasing role in the management of chronic neuropathic pain, especially in merely sensitive neuropathies like ACNES. We support future research on this theme.

Keywords: ACNES; chronic pain; modular analgesia; peripheral nerve stimulation; radiofrequency.

Özet

Anterior kutanöz sinir sıkışma sendromu (ACNES), özgül bir anterior karın duvarı bölgesinde, orta ila şiddetli kronik ağrı, hiperestezi/hipoestezi ve ısı/soğuk algısında değişikliğe sebep olan, bir veya daha fazla interkostal sinirin ön dallarının innerve ettiği bölgeye atfedilebilen bir durumdur. Şu anda mevcut olan tedavi seçeneklerinden hiçbiri uzun vadede veya kesin olarak etkili olmamıştır. Son yıllarda, bu gibi saf duyusal nöropatileri, kablosuz periferal sinir stimülatörleri (PNS) implantasyonu ile tedavi etmeye başladık, modüler ve kişiselleştirilmiş analjezi güvenliğine ulaştık. İki yıldır 8. interkostal sinirin ACNES'inden muzdarip 41 yaşında bir erkek hastanın vakasını rapor ediyoruz. İlk olarak, 8. interkostal sağ sinirin anterior kutanöz dalının iki ardışık ultrason kılavuzluğunda tanısal bloklarını gerçekleştirdik ve ardından hastayı ultrason kılavuzluğunda sinir dekompresyonunu takiben nöromodülasyon ve darbeli-radyofrekans (PRF) uygulaması için seçtik. Tam istihdam, genç yaş ve tedavinin birkaç kez tekrarlanması gerekliliğini göz önünde bulundurarak, onu ultrason kılavuzluğunda Periferal Sinir Stimülasyonu (PNS) implantasyonu için değerlendirdik ve kablosuz elektrodu sağ 8. interkostal sinirin anterior dalına yerleştirdik ve tonik stimülasyonu 100 Hz PW 200 ms olarak programladık. Hasta, hemen ağrıda rahatlama bildirdi ve bu sorun için bir daha asla ilaç almadı, iki yıllık takipte. PNS, özellikle ACNES gibi sadece duyarlı nöropatilerde kronik nöropatik ağrının yönetiminde giderek artan bir rol oynamıştır. Bu tema üzerine gelecek araştırmaları destekliyoruz.

Anahtar sözcükler: ACNES; kronik ağrı; modüler analjezi; periferal sinir stimülasyonu; radyofrekans.

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Introduction

Anterior cutaneous nerve entrapment syndrome (ACNES) is a non-rare cause of abdominal pain often confused with other clinical entities of the gastrointestinal tract, especially from visceral causes. It is a nosological entity characterized by moderate to severe chronic pain in a circumscribed area of the anterior abdominal Wall,[1] evoked by even modest exercise or postural changes. Accompanied by a variety of sensory disorders of the painful area (hyperesthesia, hypoesthesia, alteration of the perception of cold). Clinical signs are: positive pinch sign (78%), positive Carnett's sign (87%), and a positive response to a modified rectus sheath block >50% pain reduction (81%);[2,3] the Scratch Collapse Test (SCT) is potentially valid in some cases.[4] Diagnostic investigations: ultrasound and CT of the abdomen are usually negative; blood test examinations are also negative, and no specific laboratory markers exist. The clinical history of these patients is most often silent, but sometimes there may be a history of previous surgery on the upper abdomen, often laparotomic or laparoscopically, and the scarring area is often involved. The pathophysiology is not fully known, but there may be different causes that contribute to creating an entrapment of the intercostal nerve endings, which at this level are purely sensitive, while they enter the posterior sheath of the rectus abdominis muscle.[5]

Case Report

We present the case of a 41-year-old man, with a silent pathological anamnesis, suffering from epigastric pain for 2 years, exacerbated by exercise and modest weight lifting, like picking up his child. All radiological investigations: abdomen CT, EGDS, and bone scintigraphy were negative. At physical examination, the patient reported: a positive Carnett's sign, hyperesthesia, and dynamic and static mechanical allodynia. The therapeutic process, in the suspicion of ACNES of the 8th intercostal nerve, began with the administration of Lidocaine 5% transdermal. Then, we performed two consecutive ultrasound-guided diagnostic blocks of the anterior cutaneous branch of the 8th intercostal right nerve (lidocaine 2% 1 ml injection=20 mg), both achieving 100% reduction of painful symptoms. We thus elected the patient to carry out ultrasound-guided nerve decompression using glucose 5%, followed by neuromodulation with pulsed-radiofrequency (PRF) by cannula 22Gauge (G) 10 cm Active tip 10 mm, PRF 100V 42 °C for 10 min G4 Cosman™ with a good but temporary analgesic result. The next step was to perform a neurotomy with continuous radiofrequency at 72 °C for 90 seconds by cannula 10 cm Active tip 10 mm Cosman™. Considering the necessity of repeating this treatment after a few months and taking into account the young age and the full working condition, we proposed the implantation of a peripheral neurostimulator (PNS), which is what we did after 4 months for the reappearance of neuralgia at San Paolo Hospital of Civitavecchia (Rome). In sterile conditions, we performed the percutaneous procedure: after ultrasound detection of the target structure, the fibronervous tunnel of the posterior fascia of the rectus abdominis muscle, with mediolateral needle access, we implanted the Stimrouter Bio-

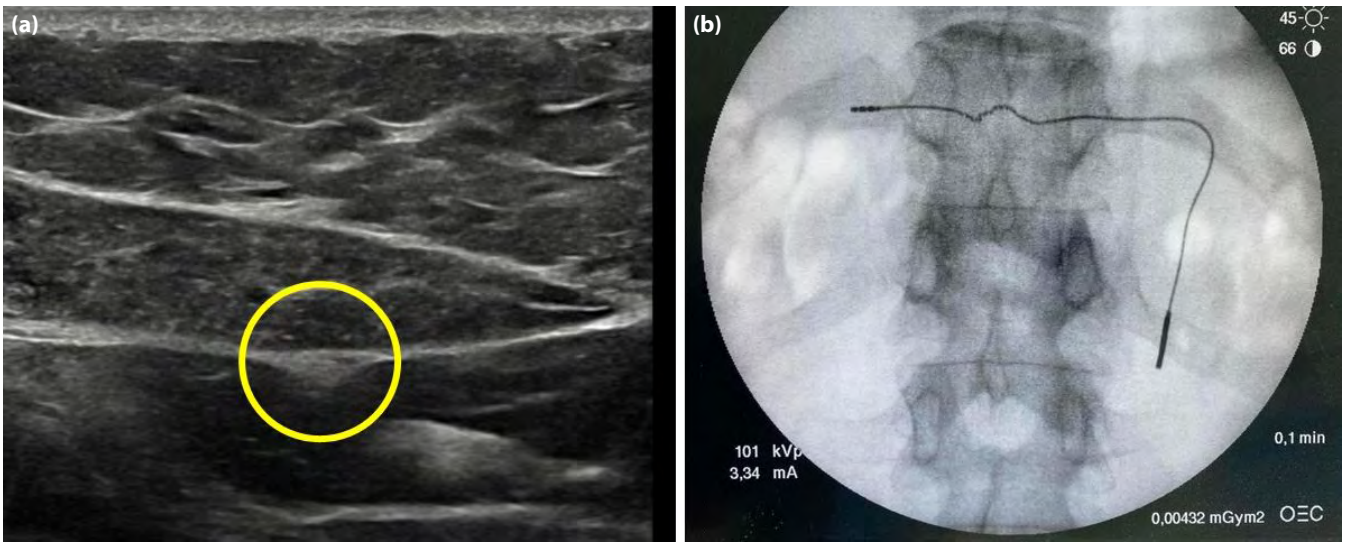

Figure 1. Ultrasound image of anterior cutaneous nerve and PNS implantation. **(a)** Ultrasound image of the anterior cutaneous nerve detection (yellow circle). **(b)** Fluoroscopic image of the catheter positioned with an "L" shape in order to enlarge and maximize the stimulation field.

ness™ wireless lead at the anterior branch of the right intercostal 8th nerve, and programmed tonic stimulation 100 Hz PW 200 ms (Fig. 1a, b).

Discussion

The patient reported immediate pain relief, never took medication for this problem again, and currently, at two years of follow-up, can be defined as healthy. ACNES can occur in any age group, including children and the elderly, is difficult to classify, and the therapeutic options so far most traveled have been: local anesthetic injection, radiofrequency, and surgical neurectomy. In the last decade, the role of PNS has developed more and more, and in a purely sensory neuralgia like this, it could represent an effective and definitive therapy,[6] at the end of a correct diagnostic and therapeutic framework. Limitation: this work concerns only one case report, but we expect that this therapeutic conduct can be generalized to many cases of ACNES. This case shows how PNS has proved to be effective in a patient suffering for years, where all other strategies proved not to be therapeutic. We, therefore, encourage future trials on the same subject; our limited experience could be a starting point for future research.

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